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FOREIGN WEAPONS SERIES

~~ST F 9-260-1~~

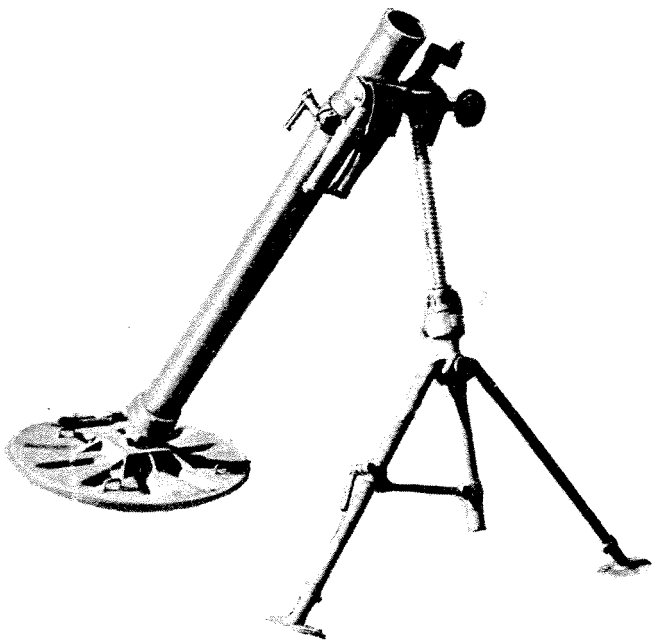
USERS GUIDE

FOR

SOVIET 82mm MORTARS

MODELS 1937, 1941 and 1943

MAY 1951



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Ordnance Intelligence

Washington, D. C., May 1951

FOREIGN WEAPONS SERIES

USERS GUIDE

FOR

SOVIET 82mm MORTARS

Model 1937, new type
Model 1937, 1942-1943 version
Model 1937, old type
Model 1941
Model 1943

This pamphlet contains a brief description of the Soviet 82-mm mortars, sights, ammunition, and instructions for maintenance in the field.

Suggestions for correction or additions should be forwarded direct to Office, Chief of Ordnance, ATTN: ORDGU-IN, The Pentagon, Washington 25, D.C., so that any revision of the text can incorporate the change.

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SECTION I. INTRODUCTION

1. PURPOSE. This guide is published for the information and guidance of the using arms and other forces or agencies concerned, until such time as it is superseded by an approved Department of the Army manual.

2. SCOPE.

a. This guide describes the following Soviet 82-mm mortars: model 1937, new type; model 1937, 1942-1943 version; model 1937, old type; model 1941; and model 1943. See figures 1 through 5. It also contains technical information required for the identification, operation and care of the mortar, ammunition, accessories, and firing tables.

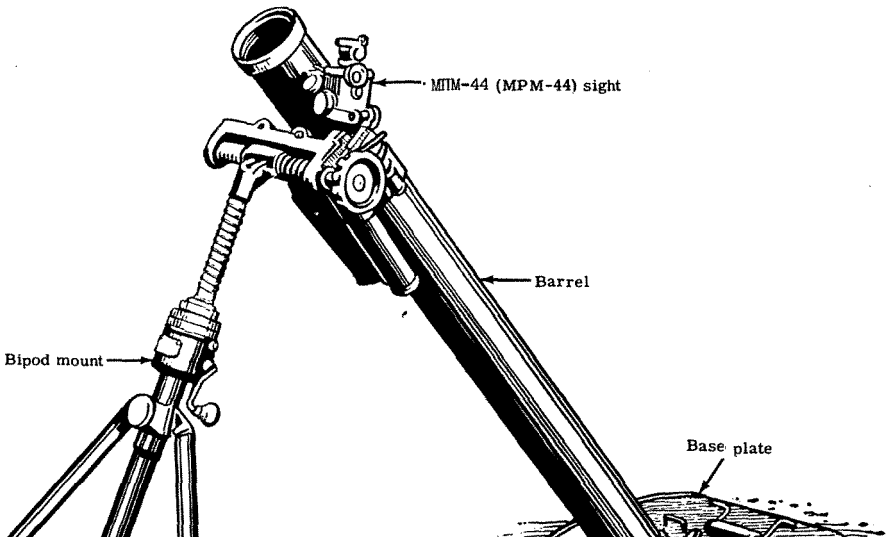

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Figure 1. Soviet 82-mm mortar, model 1937, new type.

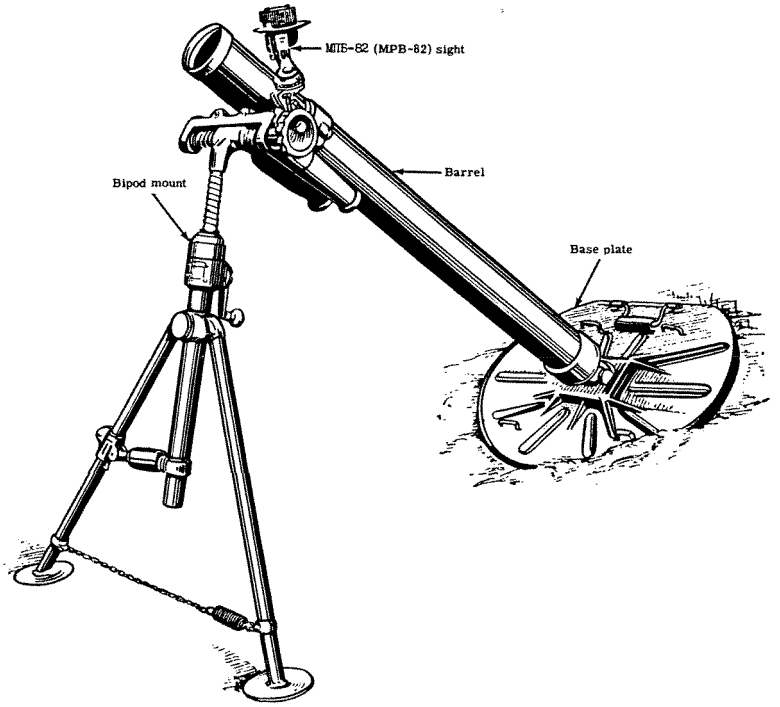

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Figure 2. Soviet 82-mm mortar, model 1937, 1942-1943 version.

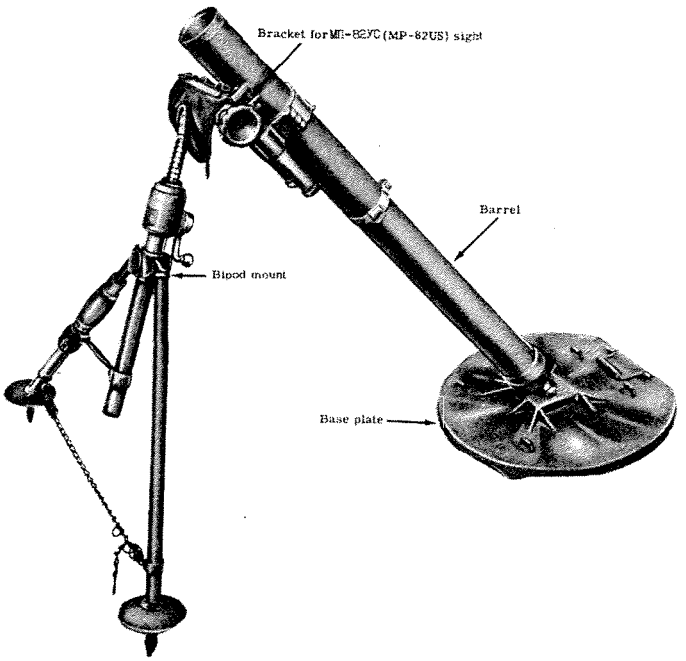

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Figure 3. Soviet 82-mm mortar, model 1937, old type.

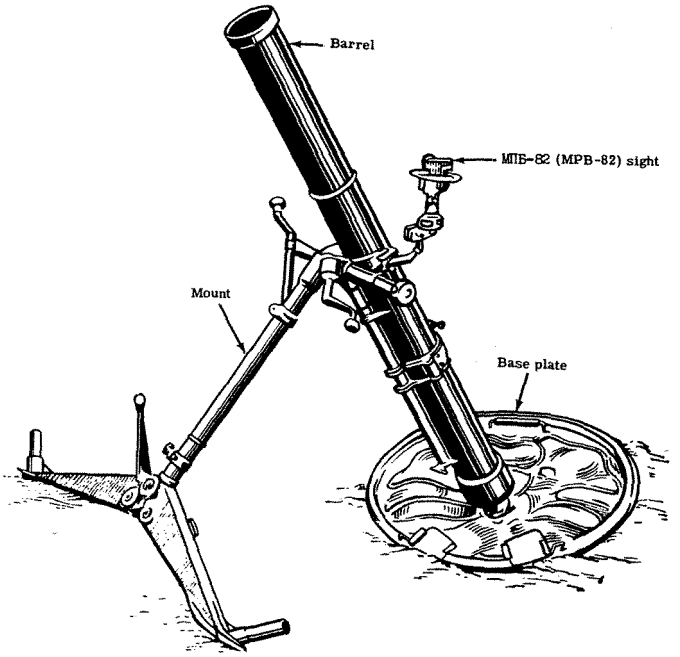

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Figure 4. Soviet 82-mm mortar, model 1941.

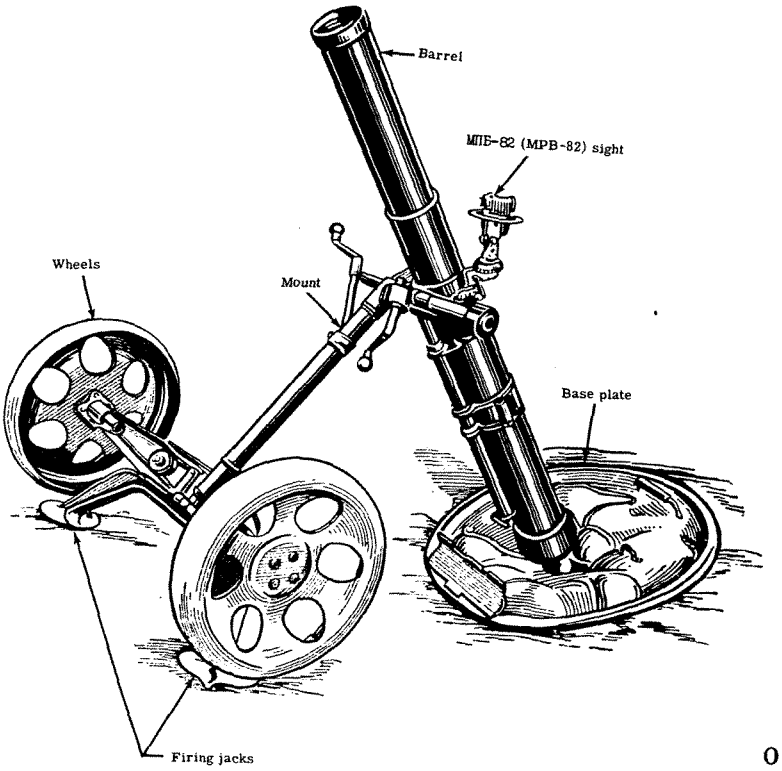

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Figure 5. Soviet 82-mm mortar, model 1943.

b. Disassembly, assembly, and those repairs as may be handled by using arm personnel will be undertaken only under the supervision of an officer. In all cases where the nature of the repair, modification, or adjustment is beyond the scope of the facilities of the using arm, the Ordnance Corps should be informed so that trained personnel, with proper tools and equipment, may be provided or instructions issued.

3. REFERENCES. This text is based on a translation of the original Soviet manual on 82-mm mortars. The illustrations are made either from the text or the actual weapon.

SECTION II. DESCRIPTION AND DATA

4. DESCRIPTION.

a. The Soviet 82-mm mortar is a smooth-bore, muzzle-loaded, high angle-of-fire weapon with a fixed firing pin for drop firing. A base plate, to which the tube is attached, holds the tube in position and absorbs the shock of recoil during firing operations.

b. The 1937 models utilize conventional bipod mounts, while the 1941 and 1943 models have mounts with wheels. All the mortars described herein have the same ballistic characteristics and use the same ammunition. The mortar can be carried in three one-man loads. In addition, the 1941 and 1943 models may be towed by a member of the crew.

c. The bipod mount, which supports the muzzle of the weapon, is equipped with a spring-type shock absorber designed to reduce the shock imparted by firing; this safeguards the aiming and sighting mechanisms.

d. The 1937 model, old type, was the first battalion mortar accepted by the Soviet Army. It was issued in limited quantity and may no longer be available in the Soviet Army. This mortar was improved in 1942 (1942-1943 version) and again in 1945 (new type).

e. In 1941, a mount to which wheels could be attached was adopted to provide greater mobility. The base plate was also improved. In the firing position, the wheels are detached. In 1943, modifications were introduced to provide nondetachable wheels; firing jacks are lowered when in the firing position.

5. TABULATED DATA.

Item	1937 model	1941 model	1943 model
Code number	52-M-832III	52-M-832M	52-M-832C
Caliber	82-mm	82-mm	82-mm
Weight in firing position	123 lb.	114 lb. w/o wheels	128 lb. w/wheels
Weight in traveling position on wheels and w/pack	- - -	128 lb.	128 lb.
Weight of barrel w/pack	42 lb.	43 lb.	43 lb.
Weight of bipod w/pack	44 lb.	48 lb. w/wheels	51 lb.
Length of barrel	48 in.		
Diameter of base plate	23 in.		
Elevation limits	45°-85°	45°-85°	45°-85°
Traverse limits @ 45° elevation (without repositioning bipod)	±3°	±5°	±5°
Traverse limits (repositioning bipod but w/o moving base plate)	30°	25°	25°
Normal transport	3-man loads	3-man loads or towed	3-man loads or towed
Sights	See Note	МПБ-82	МПБ-82

Range, minimum	90 yd.
maximum	3320 yd.
Muzzle velocity (minimum range)	230 f.p.s.
(maximum range)	690 f.p.s.
Rate of fire (maximum)	25 r.p.m.
Ammunition	HE, Smoke

Weight of HE shell . . . . . 7.3 lb.

Note.- Sights.

Model 1937, new type - МП-41, МП-42, МПМ-44.
Model 1937, 1942-1943 version - МПБ-82.
Model 1937, old type - МП-82УС.

6. EMPLOYMENT.

a. The Soviet 82-mm mortar is a close-combat weapon with high-trajectory fire. It has the following missions:

(1) Neutralization and destruction of enemy manpower.

(2) Silencing of enemy artillery.

(3) Destruction of wire and other obstacles in the path of advancing friendly troops.

(4) Destruction of enemy materiel and equipment.

(5) Defeat of targets that are inaccessible to flat-trajectory fire.

b. Although usually emplaced in defilade, the mortar is frequently used in the open field.

c. These mortars are not effective against earthen and timber bunkers and similar fortifications.

SECTION III. DIFFERENCES BETWEEN MODELS

7. MODEL 1937, NEW TYPE (fig. 1).

a. Bipod mount.

(1) This mount is the conventional type with two legs and spades.

(2) It has no mechanism on the bipod mount for accurate cross-leveling of the yoke; a device on the sight bracket permits accurate cross-leveling of the sight only.

(3) It has twin shock absorbers.

(4) The mount is clamped on the tube near the muzzle.

(5) The sight bracket is constructed to use the **M1-41** or **M1-42** collimator sight or the **M1M-44** telescopic sight.

b. **Base Plate.**

(1) Either the model 1937 base plate (fig. 6) or the model 1941 plate (fig. 7) may be used. The 1941 plate is the same as is used with the 1941 mortar, less the mount clips.

(2) The 1937 base plate was issued up to 1945; it then was replaced by the 1941 base plate.

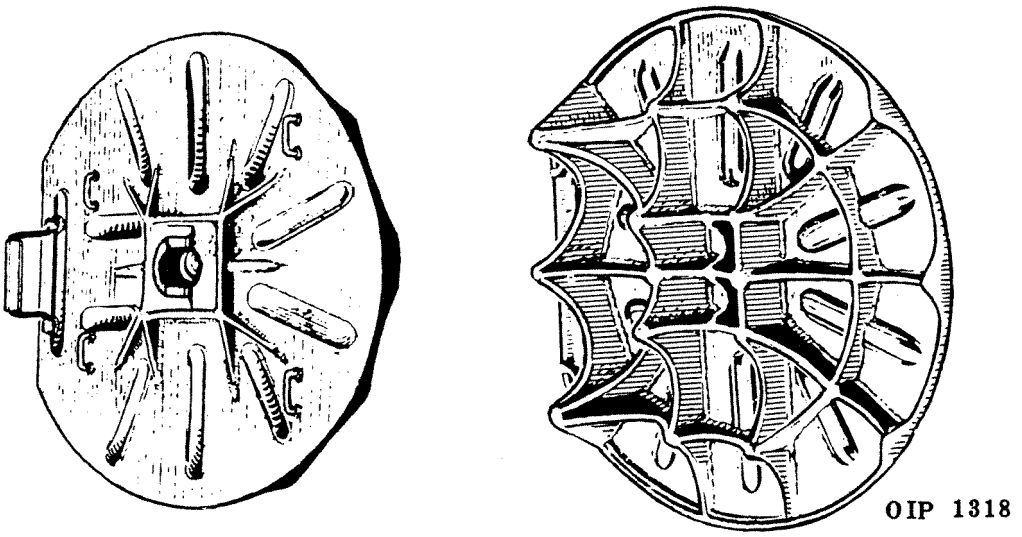


Figure 6. Base plate, model 1937.

c. Barrel. The barrel consists of the tube, base cap, firing pin, and obturator. There is no safety device on the base cap.

8. MODEL 1937, 1942-1943 VERSION (fig. 2).

a. Bipod mount. This mount is similar to the model 1937, new type, except that:

(1) It is equipped with an accurate cross-leveling mechanism located between the right leg and the elevating mechanism housing.

(2) The sight bracket is constructed to use the МПБ-82 sight.

(3) It has a level on the yoke.

b. Base plate. This mortar uses only the model 1937 base plate.

c. Barrel. Same as the model 1937, new type.

9. MODEL 1937, OLD TYPE (fig. 3). This mortar is similar to the model 1937, 1942-1943 version, except that:

a. The accurate cross-leveling mechanism is located on the right leg.

b. The sight bracket is constructed to use the МП-82УС. collimator sight or the sight adapter with either azimuth-clinometer or МПБ-82 sight.

10. MODEL 1941 (fig. 4).

a. Mount.

(1) The conventional bipod has been replaced by a mount to which detachable wheels can be attached.

(2) The accurate cross-leveling mechanism is located between the elevating mechanism housing and the right end of the traversing mechanism housing. The rough cross-leveling mechanism is located on the elevating mechanism housing.

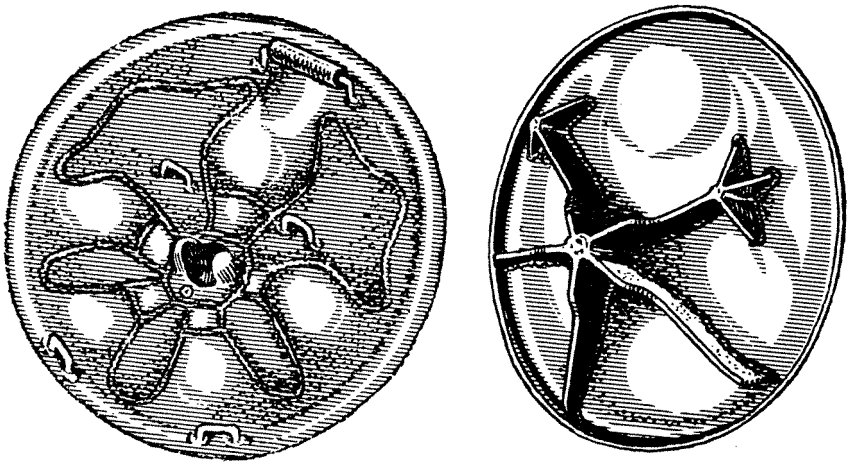
(3) There is a single long shock absorber.

(4) The mount is clamped at the middle of the tube.

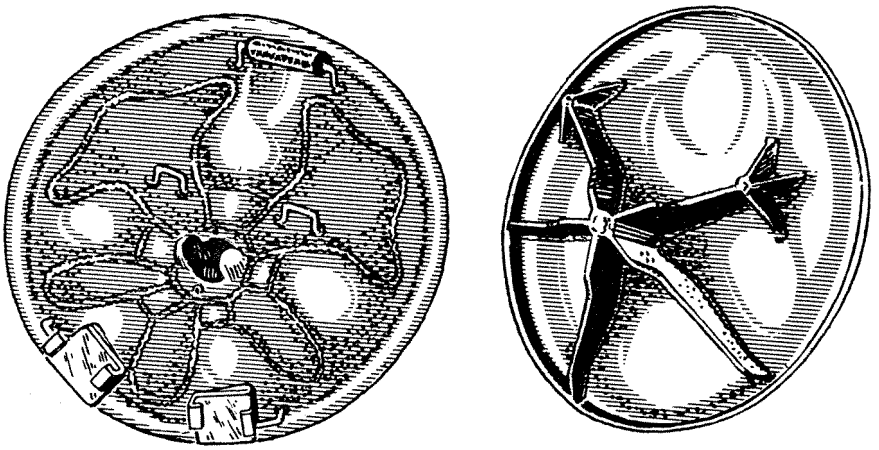
(5) The sight bracket is constructed to use the sight adapter with the МПБ-82 sight.

b. Base Plate. The base plate (fig. 7) is corrugated with spades welded underneath. It has clips to hold the mount when in the traveling position.

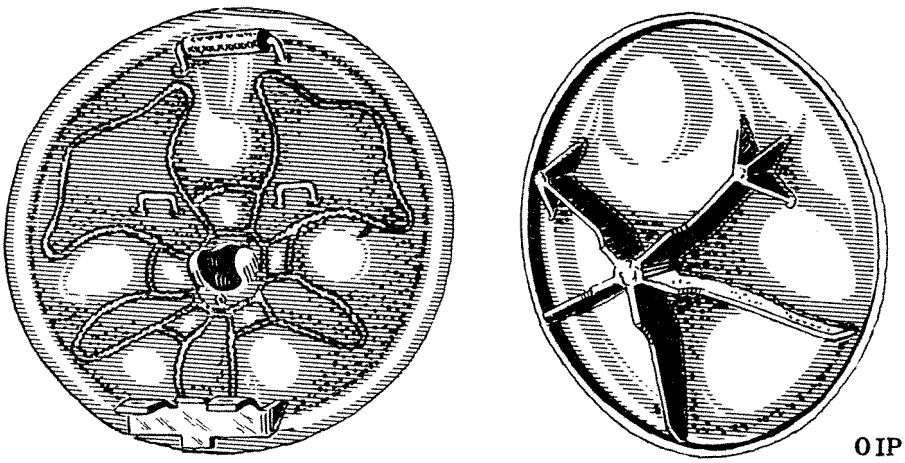
c. Barrel. There is a safety device in the base cap for use when unloading misfires.



Used with model 1937 mortar, new type.



Used with model 1941 mortar.



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Used with model 1943 mortar.

Figure 7. Base plate, model 1941.

11. MODEL 1943 (fig. 5).

a. Mount. The mount is the same as the model 1941, except that:

(1) The mount has been modified so that the wheels are not detachable. Firing jacks are lowered when the mortar is in the firing position. Other minor changes, such as metal handles instead of wooden handles, were made.

(2) The sight bracket is the same as that on the model 1937, 1942-1943 version, mortar and uses the MПБ-82 sight.

b. Base plate. The base plate is the same as the model 1941 (fig. 7), but has a special clamp for holding the bipod when in the traveling position.

c. Barrel. The barrel is the same as the model 1941.

SECTION IV. INTERCHANGEABILITY OF PARTS

12. MODELS 1937. The barrel, bipod mount (complete), and model 1937 base plate are believed to be interchangeable among all variations of this model. The model 1941 base plate (fig. 7) can be used only on the new-type 1937 mortar. It is believed that components of one type mortar can be interchanged with components of the same type.

13. 1941 AND 1943 MODELS. The barrel, mount (complete), and base plate are believed to be interchangeable. The model 1943 mortar base plate should be used with the mount of the same model, however, or difficulty may be experienced in securing the mount to the base plate in the traveling position. No difficulty in firing should be encountered. It is believed that the other parts of one model are interchangeable with parts of the same model. The elevating mechanism, accurate cross-leveling mechanism, traversing mechanism, and shock absorber are the same for both models.

SECTION V. AMMUNITION

14. GENERAL.

a. Firing tables. Firing tables for the HE rounds may be found in section XI.

b. Types of ammunition. There are two types of ammunition used in the Soviet 82-mm mortar.

(1) **HE.** HE rounds are of two designs: one with six stabilizing fins (fig. 8) and one with ten fins (fig. 9). The six-fin shell uses up to six "boat-type" increment charges, and the ten-fin shell uses up to three "ring-type" increment charges. Both rounds may be fired using only the ignition cartridge.

(2) **Smoke.** A six-fin smoke shell is also employed in this weapon.

Note: US, British, French, German, and Chinese 81-mm rounds may be fired from the 82-mm mortar.

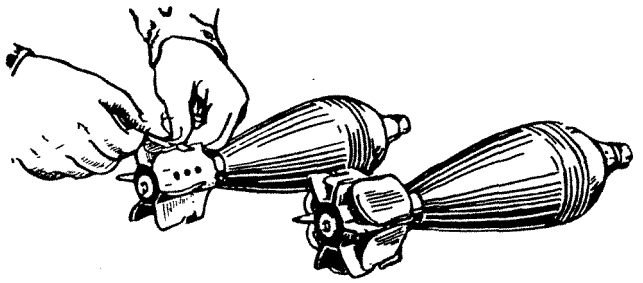

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Figure 8. Six-fin shell and boat-type increment charges for 82-mm mortar.

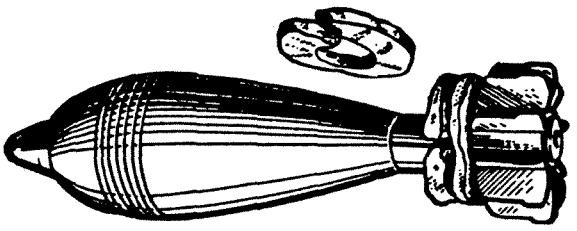

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Figure 9. Ten-fin shell and ring-type increment charges for 82-mm mortar.

15. STANDARD ROUNDS. Standard ammunition used in the 82-mm mortar is indicated in the following table. A practice-round, the **ПУ-832**, also may be encountered.

Type and Nomenclature	Fuze	Weight of Complete Round (lb.)	Maximum No. of Increments
HE (6 fins)	M-1	7.28	6
О-832	M-4	7.28	
	МП-82	6.82	
HE (10 fins)	M-1	7.28	3
О-832Д (D)	M-4	7.28	
	МП-82	7.61	
Smoke (6 fins)	M-1	8.07	6
Д-832	M-4	8.07	
	МП-82	7.61	

16. FUZES. All the fuzes listed herein for 82-mm mortars are the point-detonating type. The various fuzes are as follows, some of them being listed in the table on standard rounds.

a. M1. This fuze (fig. 10) is regarded as obsolete; however, some may still be in existence. In the event any are encountered, the safety cap must be removed before firing. If the red circle is visible, the fuze is armed and must not be fired. These shells must be set aside for explosive Ordnance disposal.

b. M2, MT82, and MTM. These fuzes are made with plastic bodies. Their use is recommended on all except rocky terrain.

c. M3 and M4. These fuzes are similar to the M2 and MT82, except that they are made with steel bodies. It is recommended they be used in mountainous areas and rocky terrain.

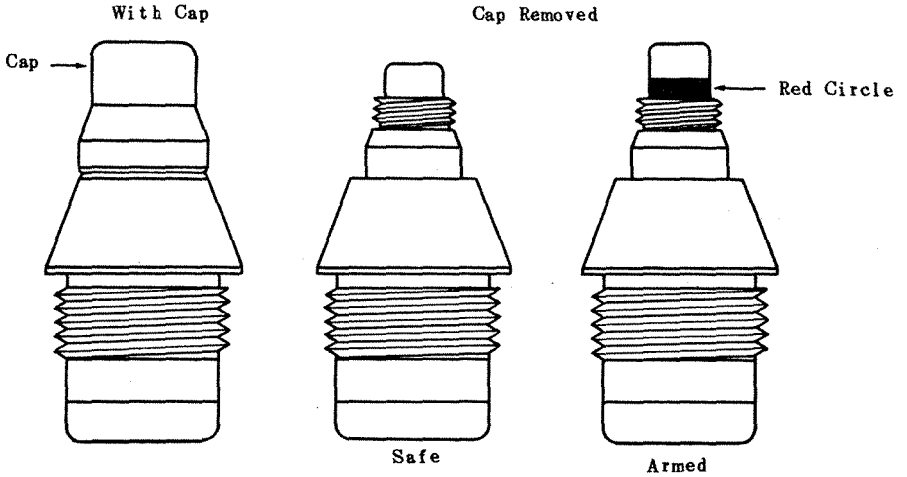

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Figure 10. Soviet M1 fuze.

17. IDENTIFICATION.

a. Body. On the body of the shell (fig. 11) are stamped the following: factory mark, lot number and year of manufacture, smelt number and Brinell hardness, inspection stamp of the military representative, and stamp of Department of Technical Control. The inspection stamp of the military representative is not stamped on all shells but only on a few in each lot.

b. Fuze. The following identification elements are stamped on the fuze around the circumference: factory mark, nomenclature symbol of the fuze, lot number and year of manufacture, stamp of the Department of Technical Control, and the inspection stamp of the military representative.

Example:

571 - Factory mark
МТМ - Nomenclature symbol
107 - Lot number
42 - Year of manufacture
AC - Inspection stamp of military representative
К - Department of Technical Control

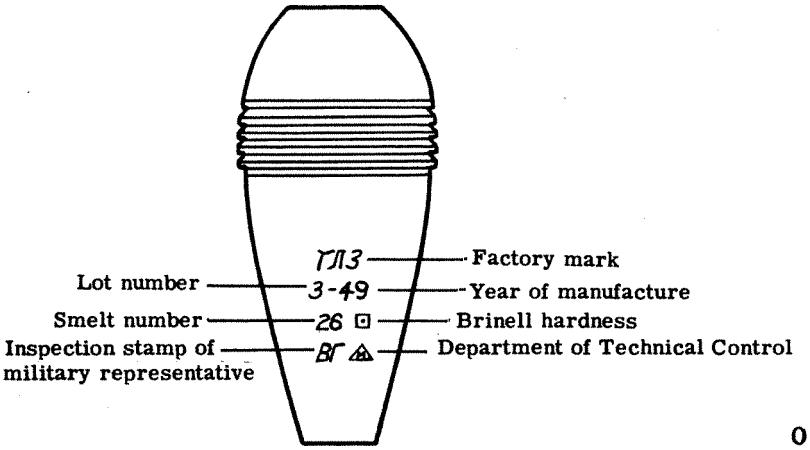


Figure 11. Stampings on 82-mm mortar HE shell.

c. Ignition cartridge. On the base of the ignition cartridge (fig. 12) are stamped the following: factory mark, year of manufacture, and diameter of the cartridge case in millimeters. On the closing disk are the following: type of powder, lot number, year prepared, and factory mark.

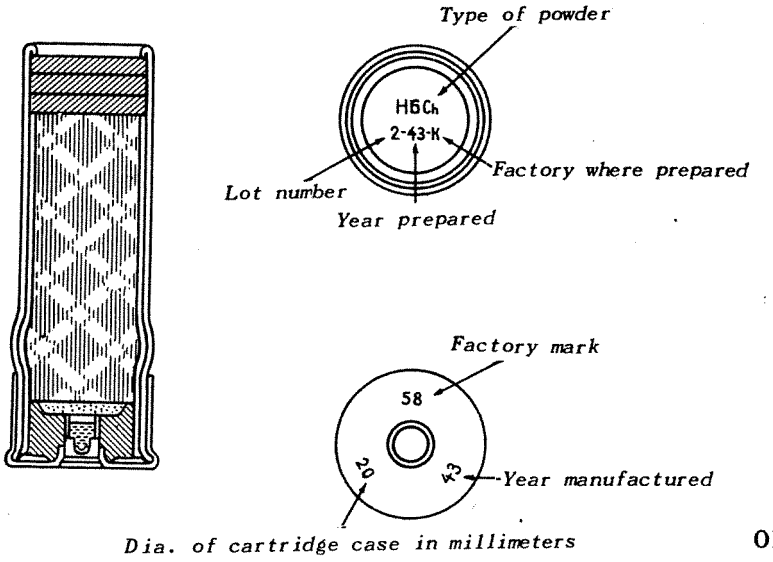


Figure 12. Markings on ignition cartridges for 82-mm mortar shells.

d. Painting and stenciling. Both HE and smoke shells are painted gray or grayish-blue color. Smoke shells can be distinguished from HE shells by the nomenclature symbol Д-832 and the black band below the bourrelet. The bourrelets on all shells are varnished to prevent rust. Shells used in wartime are unpainted. To identify shells, the following information is stenciled in black paint on the body of the loaded shell after it has been painted (fig. 13). On one side below the bourrelet are marks of the loading factory, lot number and year of loading, caliber of shell, and weight classification mark. On the opposite side below the bourrelet are stenciled the type of filler charge and nomenclature symbol.

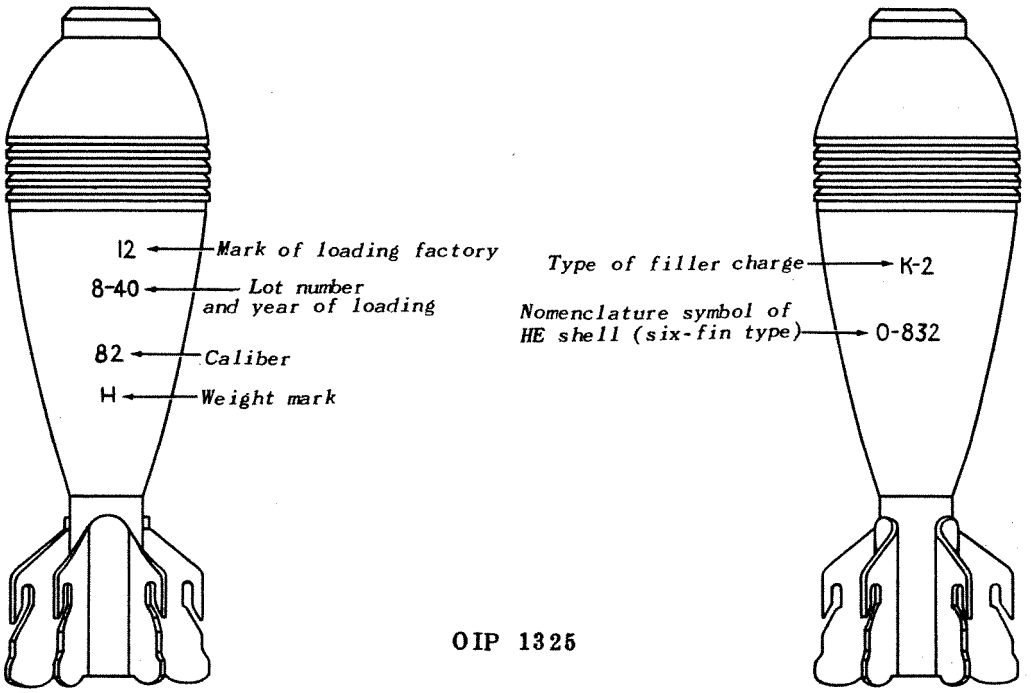

12 Mark of loading factory
8-40 Lot number and year of loading
82 Caliber
H Weight mark
Type of filler charge K-2
Nomenclature symbol of HE shell (six-fin type) 0-832
OIP 1325

Figure 13. Markings on 82-mm mortar HE shell (six-fin type).

18. INSPECTION.

a. General. All shells must be inspected and checked to insure that:

(1) No fins are missing, bent, or otherwise damaged.

(2) No rust is on the shells, especially on the bourrelet.

(3) Fuzes are on tight.

(4) Safety cap is on M-1 fuze.

(5) There is an ignition cartridge in the stabilizing tube and it is in serviceable condition.

(6) Shells with bent or broken fins are not fired.

(7) Ignition cartridges and increment charges are dry. (Damp charges result in shorts.)

(8) Ignition cartridges are fully inserted. (On partially inserted cartridges the base rips off and remains in the bore, causing subsequent misfires.)

b. Inspection and precautions before firing. Shells are delivered in completely assembled form with the fuze in place and the ignition cartridge inserted. Before firing, it is necessary to inspect the shell and make certain that:

(1) Fuze is screwed tightly into the shell nose. Do not fire shells with a M-1 fuze, if the red circle is visible (fig. 10).

(2) Membrane of the M-4 and МПМ fuzes (fig. 14) is not broken. (Do not use damaged fuzes. Set aside for explosive ordnance disposal.)

(3) Ignition cartridge is completely inserted.

(4) Increments are not torn or damaged.

(5) Correct increments are being used, the prescribed number are on the shell, and they are properly arranged. (On six-fin shells the increments must be arranged symmetrically.) Do not fire with a larger number of increments than prescribed by the firing tables.

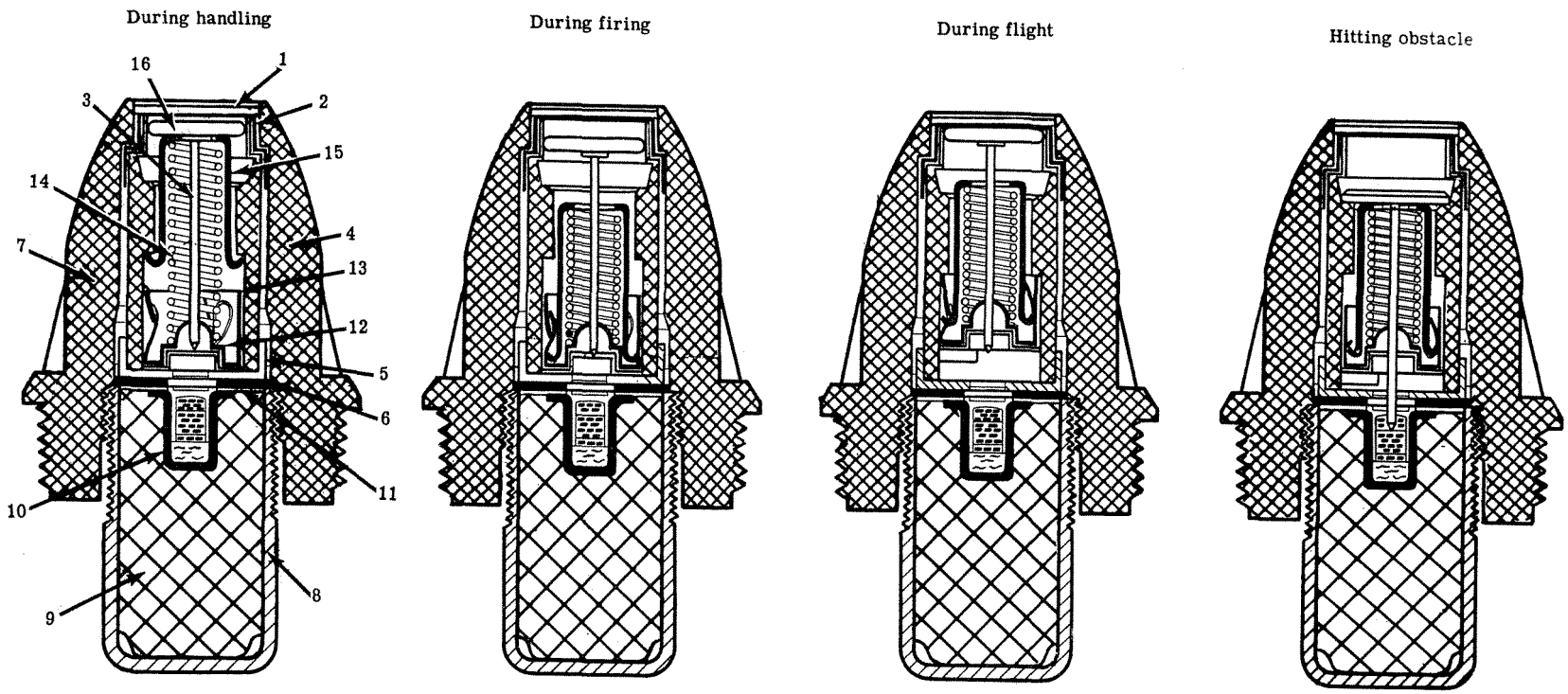
(6) Shell is clean and free of rust, dirt, and sand, especially the bourrelet and the holes in the stabilizing tube.

19. AMMUNITION CHARACTERISTICS.

a. HE. Both the six-finned and ten-finned HE shells are identical, except for the stabilizing tube (fig. 15). According to Soviet sources, each shell will produce an average of 350 lethal fragments.

b. Smoke.

(1) **Appearance.** The smoke shell resembles the six-finned HE shell, except that the smoke shell has a black band below the bourrelet and the nomenclature symbol Д-832.



1. Membrane
2. Cap
3. Firing pin
4. Bushing
5. Cup
6. Locking washer
7. Body
8. Detonator cup
9. Detonator
10. Detonator cap
11. Paper packing
12. Safety device
13. Protective case
14. Spring
15. Closing cap
16. Top of closing cap

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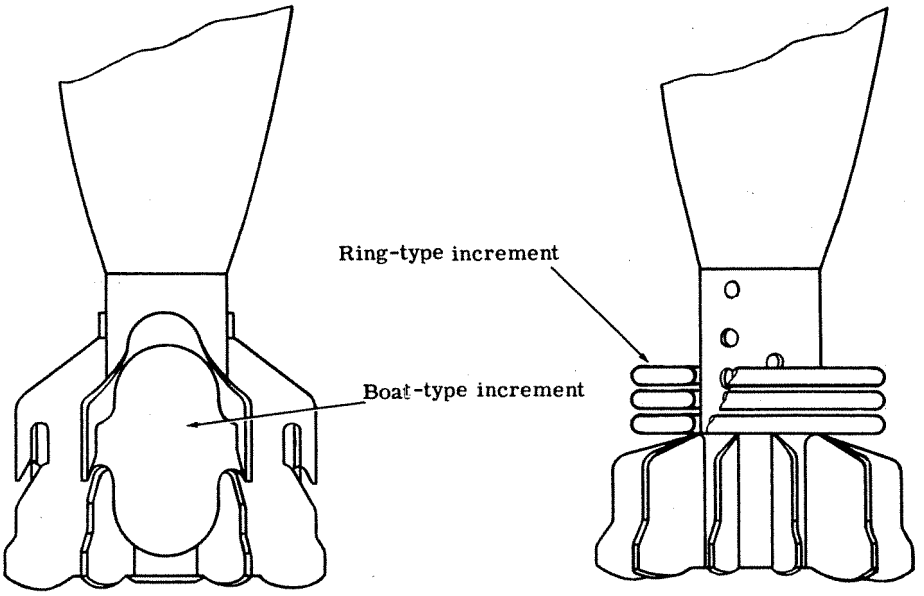
Figure 14. Soviet M4 fuze.



OIP 1327

Figure 15. Stabilizing tubes of 82-mm mortar HE shell.

(2) **Purpose.** The smoke shell is designed to obscure and neutralize enemy observation points and artillery position. The flying bits of burning phosphorous and fragments of the shell also inflict damage upon enemy troops. The fragmentation effect of the smoke shell is about 60 percent of that of the HE shell.

(3) **Screening capabilities.** The smoke forms a thick white cloud about 20-25 yards wide. Under favorable conditions, (wind velocity of less than 10 m.p.h.) the height of the smoke screen is about 15-25 yards. The following conditions are favorable for the use of smoke shells:

(a) A wind parallel to the front line of the desired smoke screen.

(b) Wind vilocity of not more than 10 m.p.h. with a wind velocity of more than 20 m.p.h. and with strong rising air currents, the smoke screen is not dependable and requires an excessive expenditure of ammunition.

(c) Absence of rising air currents.

(d) Damp weather.

(e) Hard ground in the area where the shell falls.

20. PACKING DATA.

a. Soviet mortar ammunition is usually packed as follows:

Number of Rounds	Container	Weight (lb.)
3	Metal box	31
5	Wooden box	53
10	Wooden box	108

b. Shells are shipped in ammunition cases (figs. 16 and 17) with the ignition cartridge inserted in the stabilizing tube and the fuze screwed into the body of the shell.

c. Typical packing labels for increment charges are shown in figure 18.

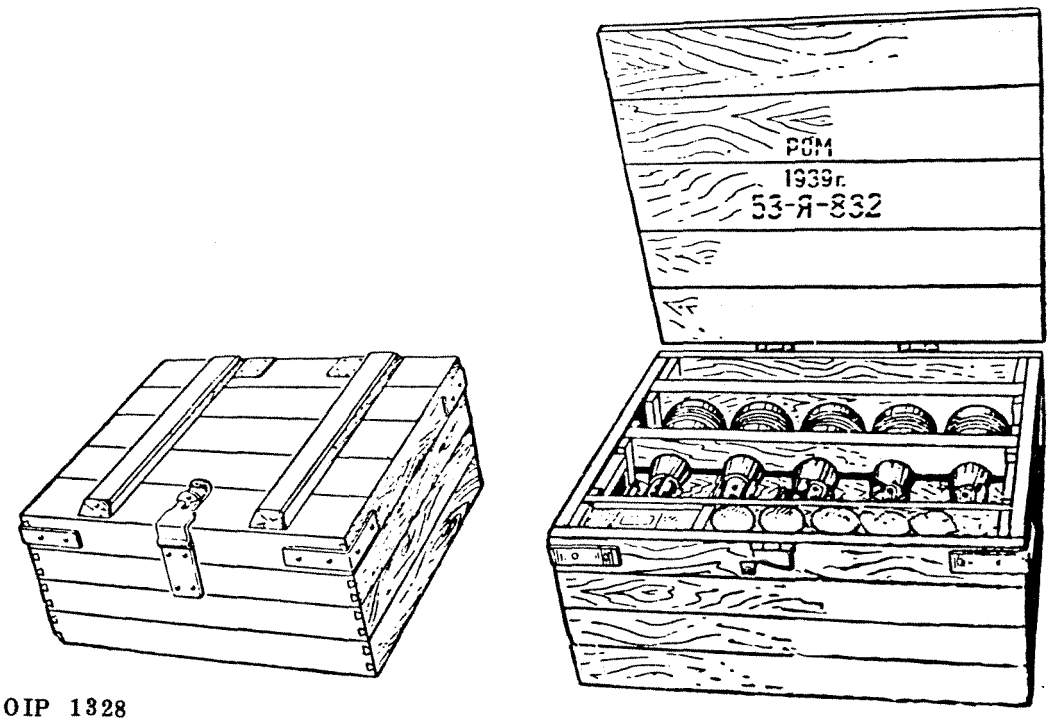


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Figure 16. Soviet 10-round ammunition case.

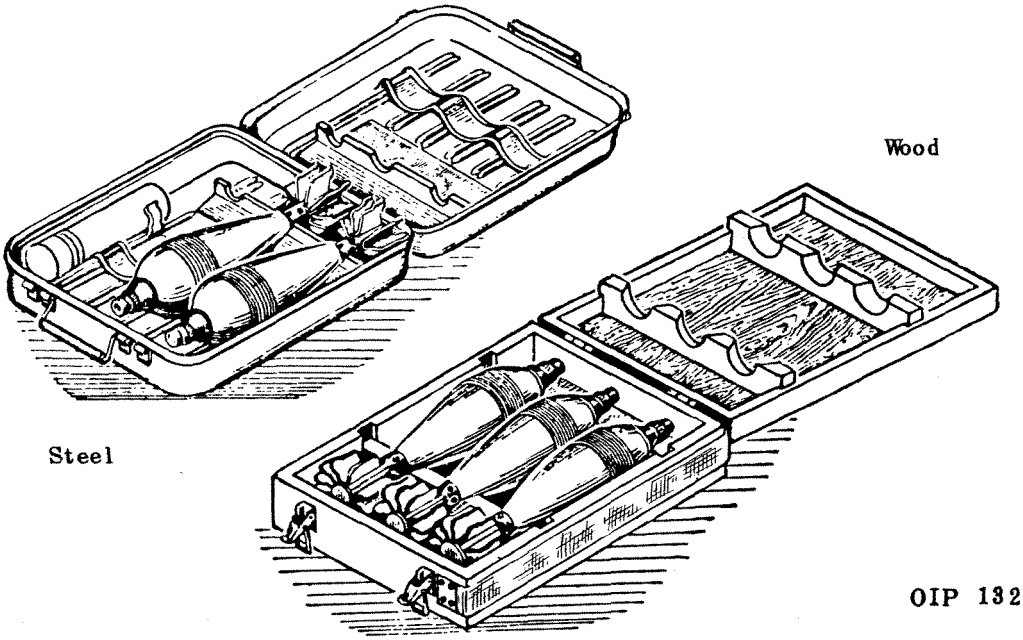
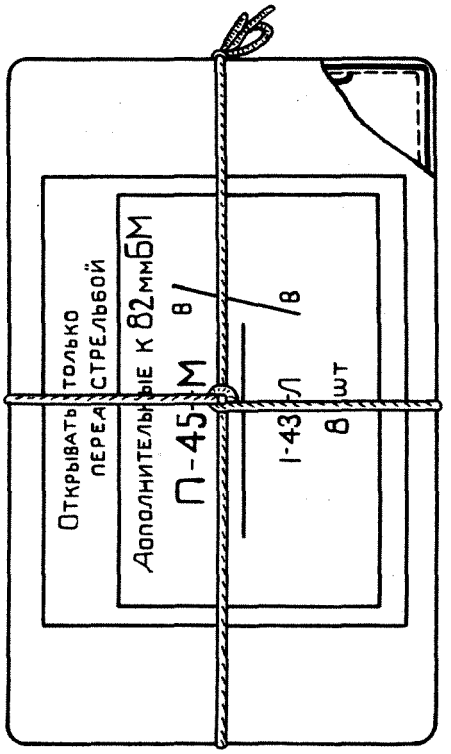


Figure 17. Soviet 3-round ammunition case.

Ring-type increments

OIP 1330



Boat-type increments

Figure 18. Typical Soviet packing labels for increment charges.

SECTION VI. SIGHTING EQUIPMENT

21. SIGHTS.

a. General. The 82-mm mortars use six different sights ranging from the azimuth-clinometer to the telescopic sight. The sights are NOT interchangeable on all models.

b. Handling precautions.

(1) Do not remove the sight when firing. Check it after every 100 rounds, or sooner, to be sure it is secure.

(2) Do not disassemble the sight to correct any defect or lubricate its parts. In case any defect disrupts the normal funcitioning, the sight must be sent to Ordnance for repair.

c. Russian mil. The Russian mil is not the same as the mil used on US equipment. The circle (360°) is divided by the Soviet Army into 6000 mils, while in the US Army the circle is divided into 6400 mils. On Soviet mortar sights, the elevation angle of 45° is arbitrarily assigned the value of 1000 mils (10 on the elevation scales). As the angular elevation increases, the mil reading decreases.

22. INSTALLATION OF SIGHT

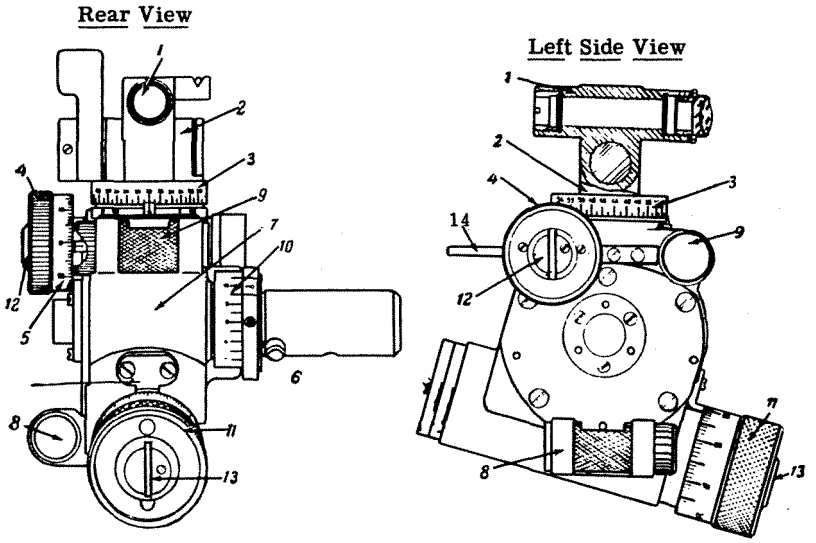
a. Model 1937, new type. The МП-41 (MP-41) sight (fig. 19) was standard during the first months of 1945. The МП-42 (MP-42) sight (fig. 20) was issued with mortars manufactured during the latter part of 1945. The МПМ-44 (MPM-44) telescopic sight (fig. 21) was issued with mortars manufactured after 1945.

(1) Turn the handle of the sight bracket to the extreme left (fig. 22).

(2) Insert the shaft of the sight into the opening in the bracket.

(3) Turn the handle of the bracket to the extreme right. The locking cone of the bracket is forced by the spring into the notch in the shaft of the sight and holds it fast.

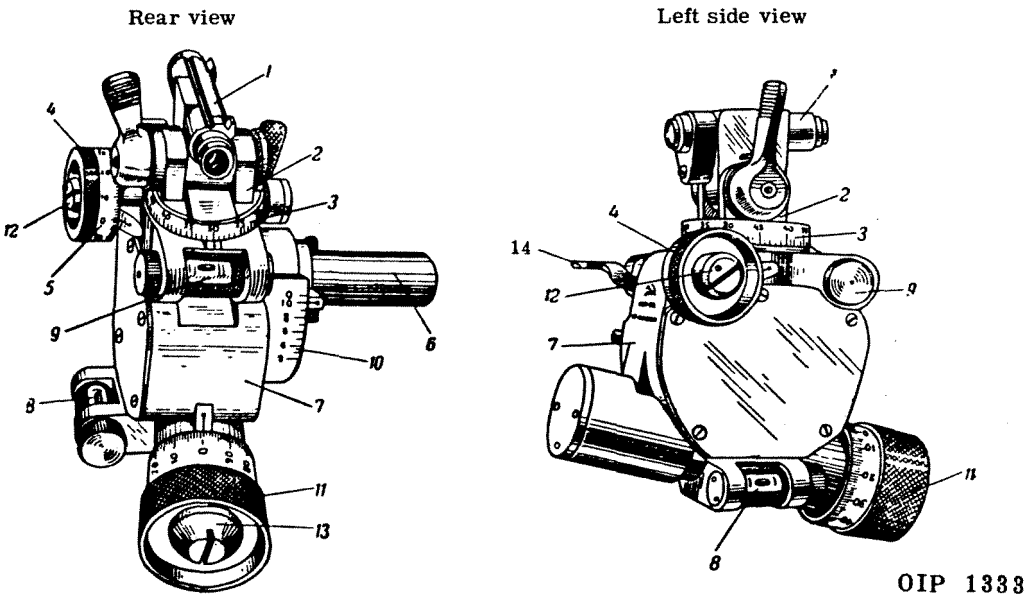
b. Model 1937, 1942-1943 version. This mortar uses the МПБ-82 (MPB-82) sight (fig. 23). Insert the sight onto the sight post on the yoke (fig. 24) and lock the clamping handle on the sight.



1. Collimator
2. Head of azimuth scale
3. Azimuth scale for rough adjustment
4. Knob of azimuth scale
5. Azimuth scale for fine adjustment
6. Shaft of sight
7. Body of sight
8. Longitudinal level
9. Cross level
10. Elevation scale for rough adjustment
11. Elevation knob
12 and 13. Adjusting screws
14. Lever

OIP 1332

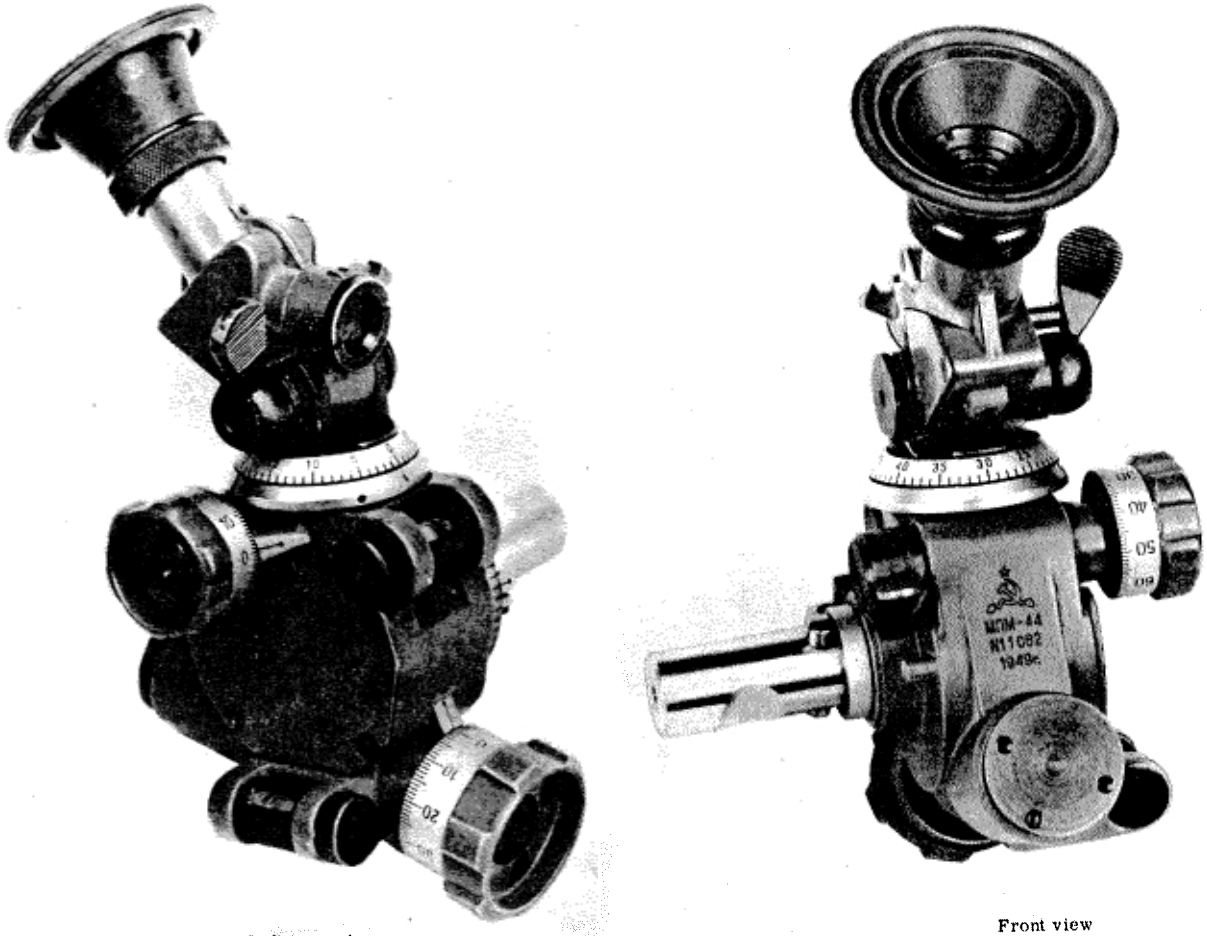
Figure 19. Soviet МП-41 (MP-41) collimator sight.



OIP 1333

1. Collimator
2. Head of azimuth scale
3. Azimuth scale for rough adjustment
4. Azimuth scale knob
5. Azimuth scale for fine adjustment
6. Shaft of sight
7. Body of sight
8. Longitudinal level
9. Cross level
10. Elevation scale for rough adjustment
11. Elevation knob
12. & 13. Adjusting screws
14. Lever

Figure 20. Soviet МП-42(MP-42) collimator sight.



Left rear view

Front view

Figure 21. Soviet МПМ-44 (MPM-44) telescopic sight. OIP 1334

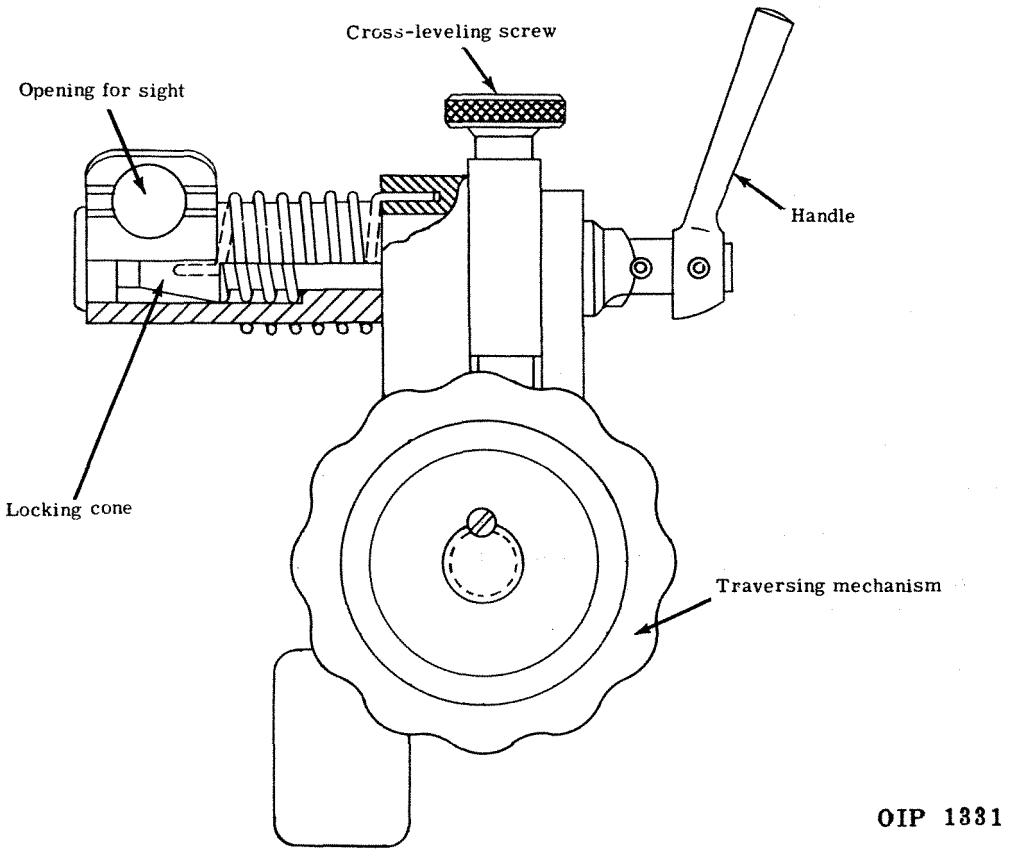


Figure 22. Sight bracket on 82-mm mortar, model 1937, new type.

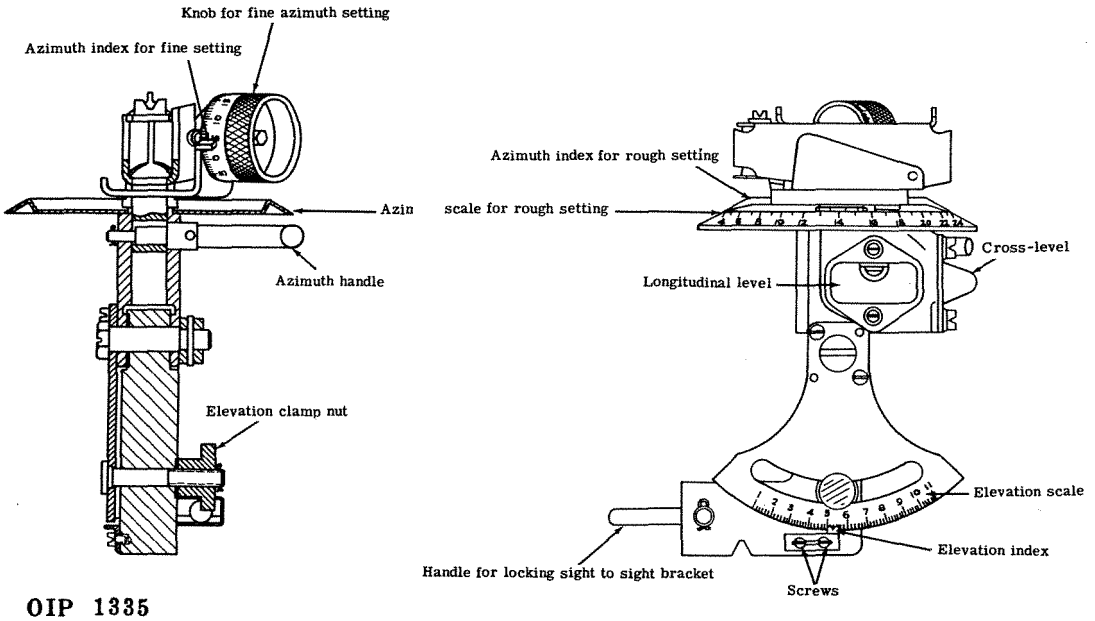
c. Model 1937, old type. This mortar uses the МП-82УС (MP-82US collimator sight (fig. 25). In 1941 this sight was replaced by the sight adapter (fig. 26) to be used with either the azimuth-clinometer (fig. 27) or the МПБ-82 (MPB-82) sight. Installation is similar to that of the 1941 model mortar.

d. Model 1941. This mortar uses the sight adapter and the МПБ-82 (MPB-82) sight. The azimuth-clinometer may also be used. The МП-82УС (MP-82US) sight may be used without the sight adapter.

(1) To install the sight adapter, move the lock by rotating the knurled nut counterclockwise (fig. 28). Place sight adapter into groove. Lock in place by rotating nut clockwise.

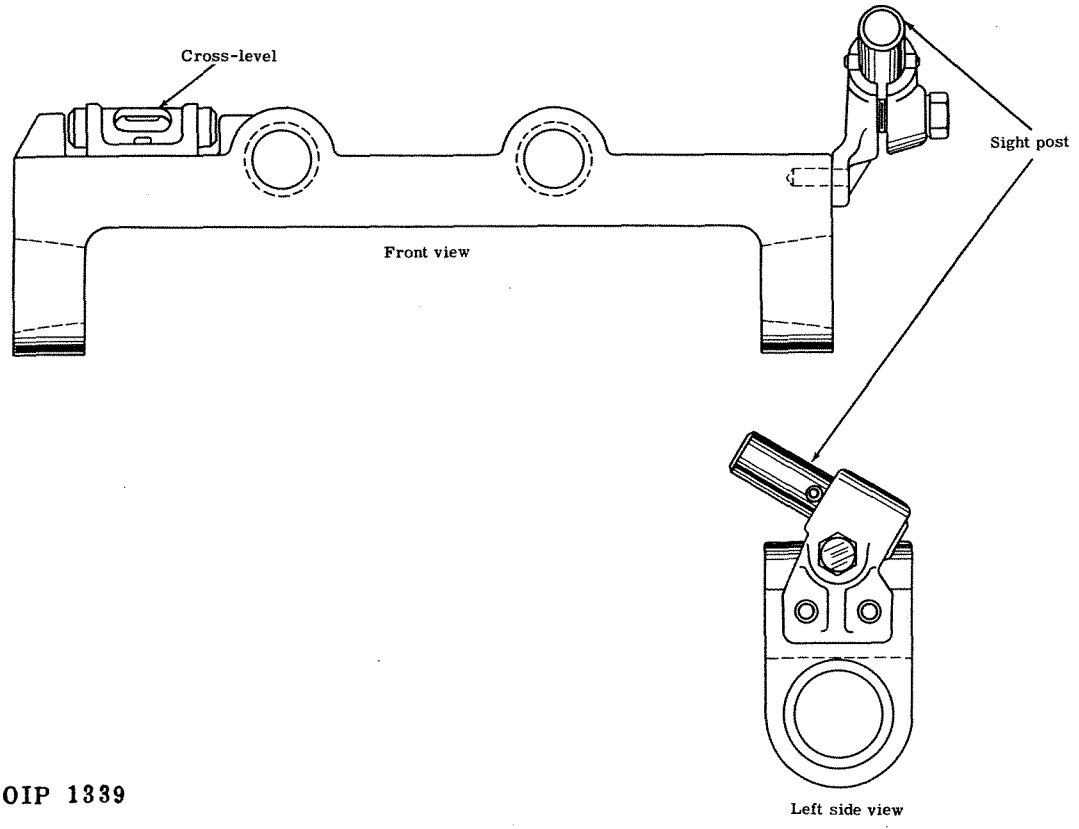
(2) The МПБ-82 (MPB-82) sight or azimuth-clinometer is placed onto the adapter. Lock by turning clamping handle on the sight.

(3) The МП-82УС (MP-82US) sight is installed in the same manner as the sight adapter.



OIP 1335

Figure 23. Soviet МПБ-82 (MPB-82) sight.



OIP 1339

Figure 24. Yoke of 82-mm mortar, model 1937, 1942-1943 version.

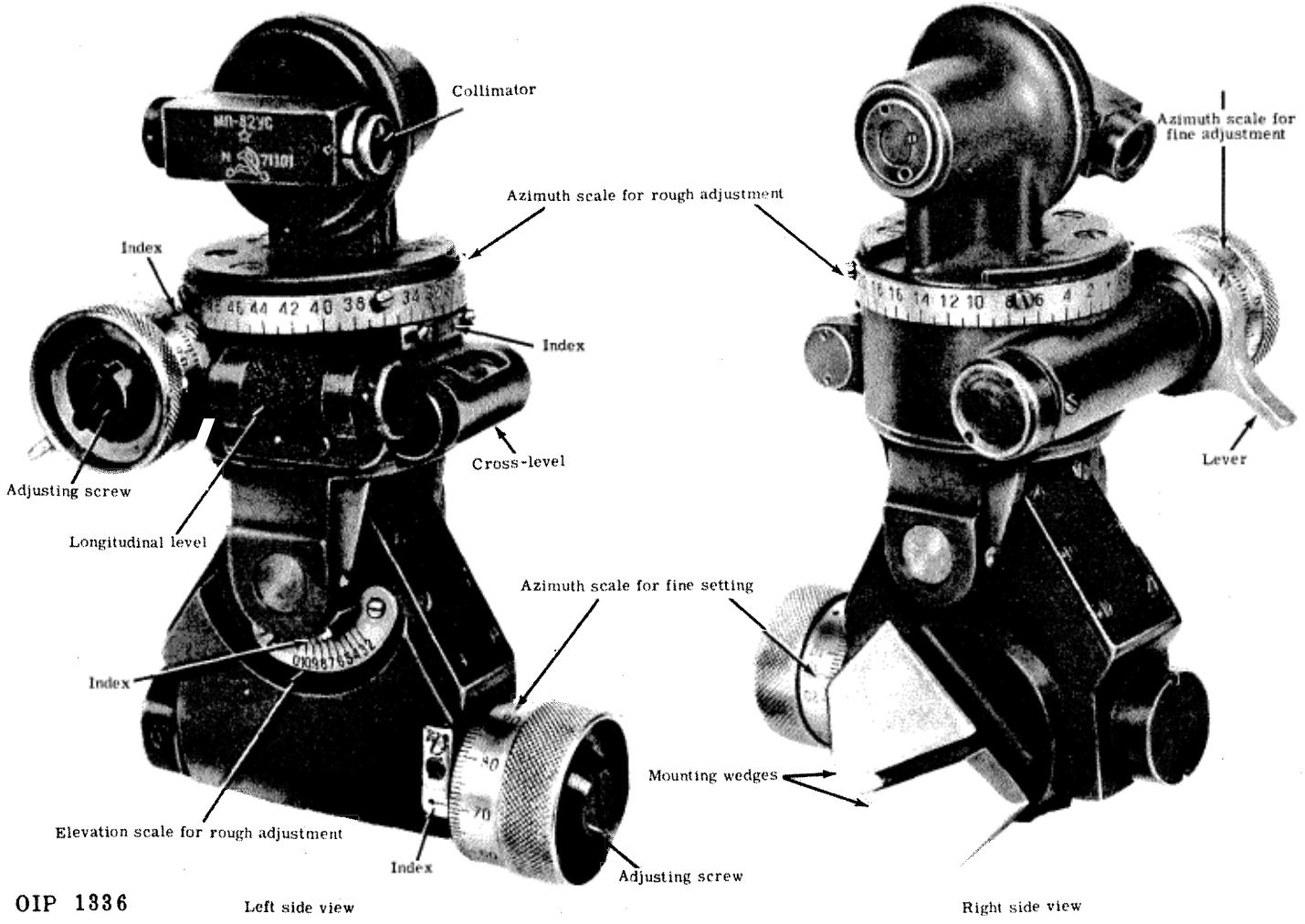
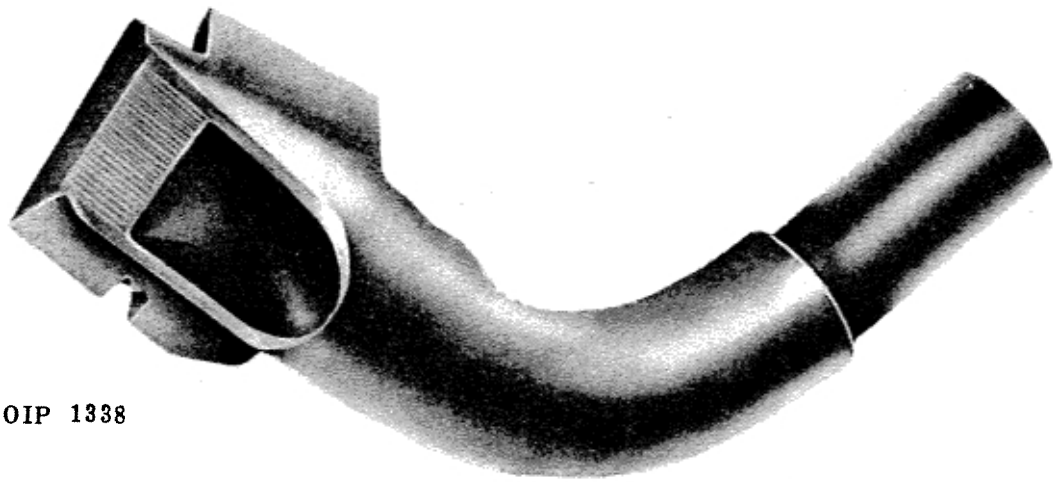


Figure 25. Soviet МП-82УС (MP-82US) collimator sight.



OIP 1338

Figure 26. Soviet sight adapter

e. Model 1943. This mortar uses the **МПБ-82** (MPB-82) sight. Insert the sight onto the sight post on the yoke, and lock the clamping handle on the sight. The sight post is the same as that on the model 1937, 1942-1943 version.

23. OPERATION OF COLLIMATOR SIGHTS. The sights covered in this paragraph are the collimator sights, **МП-41** (MP-41), **МП-42** (MP-42) and **МП-82УС** (MP-82US). They are installed as described in the preceding paragraphs.

a. For rough azimuth setting, press down lever (figs. 19, 20 and 25) and turn the head of the azimuth scale by hand. Return lever to original position.

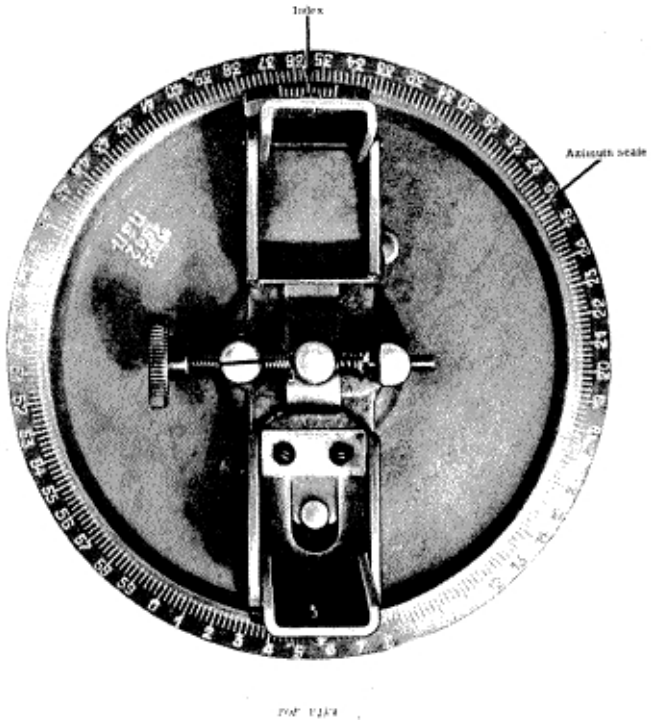
b. For fine azimuth setting, turn knob of azimuth scale for fine adjustment.

c. In sighting with the collimator (fig. 29), the gunner's eye must be kept 2 to 2-1/2 inches from the lens. The slit will then be clearly seen.

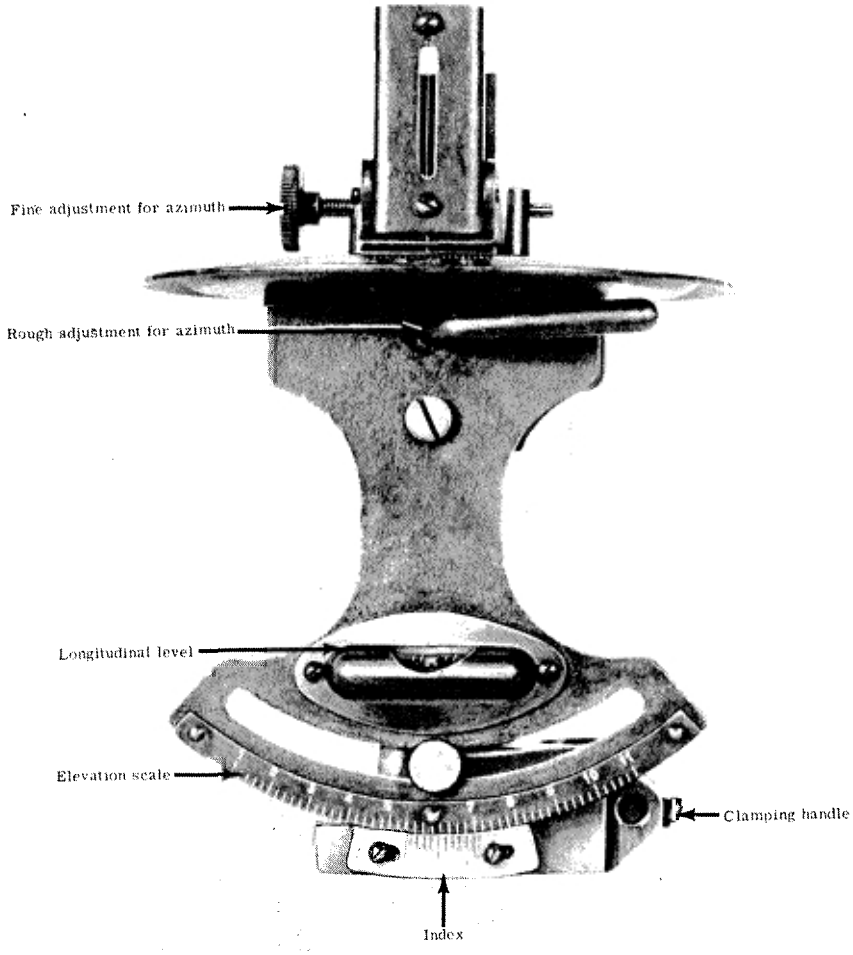
d. In laying the mortar, look over the collimator tube. The upper end of the slit must be alined with the aiming point. The aiming point should not be sought directly in the slit, as it will not be visible.

e. For elevation setting, turn the knob of elevation scale for fine adjustment (figs. 19, 20, and 25).

24. OPERATION OF МПМ-44 (MPM-44) TELESCOPIC SIGHT. The operation of the **МПМ-44** sight (fig. 21) is the same as the **МП-41** (MP-41) collimator sight (fig. 19), except that the gunner looks



TOP VIEW



LEFT SIDE VIEW

OIP 1337

Figure 27. Soviet azimuth-clinometer.

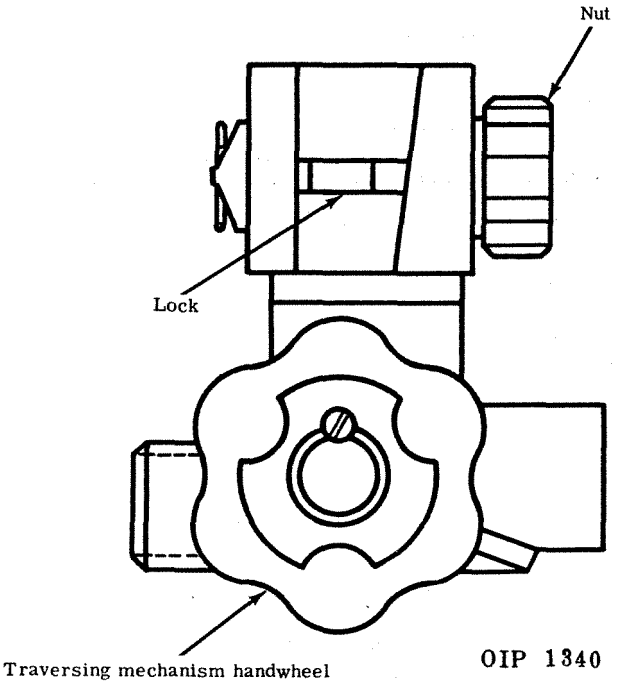


Figure 28. Sight bracket on 82-mm mortar, model 1941.

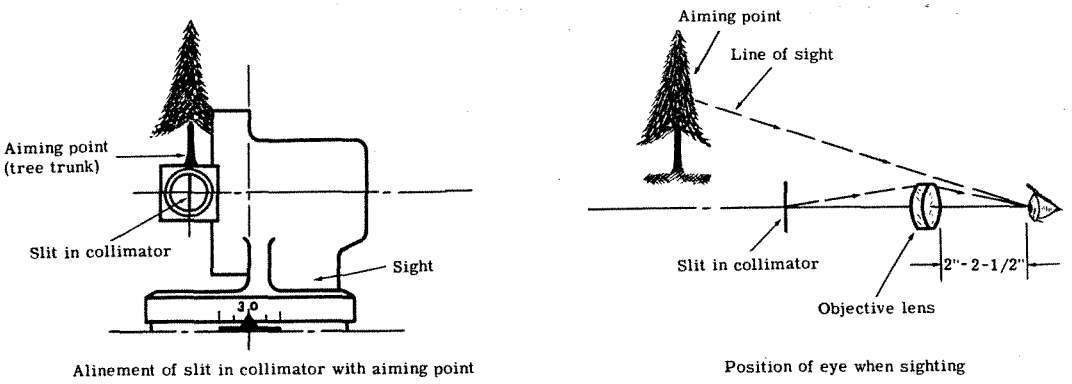


Figure 29. Laying with collimator sight.

directly into the rubber eyepiece and alines the vertical cross-hair with the edge of the aiming point (tree, building, etc.).

25. OPERATION OF M1E-82 (MPB-82) SIGHT (fig. 23). The azimuth and elevation scales are numbered in hundreds of mils. Each subdivision of the scales is 20 mils (0-20).

a. Rough azimuth setting. Rotate azimuth handle upwards. Rotate the index so that it coincides with a line near the exact azimuth

desired. (If, for example, azimuth 28-52 is desired, then set the index at 28-40.) Turn the azimuth handle down as far as it will go.

b. Fine azimuth setting. Turn the azimuth scale for fine adjustment. (In the example above, turn the scale to number 12. Thus, 29-40+0-12 = 28-52, the desired azimuth.)

c. Elevation setting. Turn the elevation clamp nut clockwise. Set the desired scale mark at the index. Tighten the nut securely by turning counterclockwise.

26. OPERATION OF AZIMUTH-CLINOMETER. Operation is similar to that for the **MIE-82** (MPB-82) sight. See paragraph 25.

27. CHECKING AND ADJUSTING ZERO LINE OF COLLIMATOR SIGHT.

a. General

(1) These instructions apply specifically to the **MI-41** (MP-41) and **MI-42** (MP-42) collimator sights. The other sights are checked and adjusted in a similar manner.

(2) The zero line of sight is correct if the white longitudinal line on the barrel of the mortar and the sighting line (azimuth set at 30-00) are parallel.

b. To check zero line of sight.

(1) Set up mortar in direction of an aiming point not less than 450 yards from mortar.

(2) Level mortar, using cross-level of sight.

(3) Set barrel at an angle of 45° with the mortar elevating mechanism. Check by using quadrant (fig. 30) on control surface of barrel.

(4) Traverse barrel so that the white line is directed toward aiming point.

(5) Check the cross-level of the sight.

(6) Direct the sighting line of sight toward aiming point without displacing mortar.

(7) If azimuth scale of sight is now set at 30-00, the zero line of sight is correct.

(8) If the setting of the azimuth scale is off by more than 2 mils (0-02), the sight must be readjusted.

c. Alternate method for checking zero line of sight.

(1) In the absence of a distant aiming point, the zero line of sight may be checked with a board on which lines have been drawn.

(2) On a sheet of plywood (or any board or box) mark two parallel lines, each 8 to 10 inches long and 1/8 to 3/16 inches thick.

(3) The distance between the lines, when using the МПБ-82 (MPB-82) sight on the following mortars, should be:

5-1/16 inches (129-mm)	-	Model 1937, 1942-1943 version.
5-1/4 inches (133-mm)	-	Model 1941.
4 inches (101-mm)	-	Model 1943.

(4) The distance between the lines, when using the МП-41 (MP-41), МП-42 (MP-42) or МПМ-44 (MPM-44) sights on the model 1937 mortar, new type, should be 5-3/8 inches (137-mm).

(5) The board with the lines must be set vertically in front of the mortar at a distance of not less than 10 yards. The white line on the barrel should be directed at the right line of the board. The sight should be directed at the left line on the board.

(6) If the azimuth scale of the sight is now set at 30-00, the zero line of sight is correct. If the setting of the azimuth scale if off by more than 2 mils (0-02), the sight must be readjusted.

d. To adjust azimuth scale for fine adjustment.

(1) Loosen the set screw which holds the adjusting screw 12, two turns (fig. 19).

(2) Loosen screw 12 one turn.

(3) Hold azimuth knob in right hand and turn azimuth scale with left hand for fine adjustment, until the number 0 coincides with the index.

(4) Check to make sure that mortar has not been displaced.

(5) Tighten screw 12 and tighten its set screw.

e. To adjust azimuth scale for rough adjustment. If the index of the azimuth scale for rough adjustment does not coincide with the graduation 30, make the following adjustments:

(1) **МП-41 (MP-41) sight.** Unscrew, by half a turn, the screw of the index and bring the index opposite graduation 30. Tighten the screw.

(2) **МП-42 (MP-42) sight.** Unscrew the two screws of the metal strip fastening the ring to the azimuth scale for rough adjustment. Make graduation 30 on the ring coincide with the index. Tighten the screws.

28. CHECKING AND ADJUSTING ELEVATION SCALE OF COLLIMATOR SIGHT.

a. General.

(1) These instructions apply specifically to the **МП-41** (MP-41) and **МП-42** (MP-42) collimator sights. The other sights are adjusted in a similar manner.

(2) The elevation scale is correct if the scale reading is 1000 mils (10-00) with the mortar tube at 45° elevation.

b. To check elevation scale of sight.

(1) Place with mortar in a horizontally level position. Check with the cross-level of the sight.

(2) Set barrel of mortar at an angle of 45°. Check by using quadrant (fig. 30) on the control surface of the barrel.

(3) Bring bubble of longitudinal level of sight to the center by turning elevation knob of sight.

(4) The graduation 0 on the elevation scale for fine adjustment should be opposite its index. If the difference exceeds 2 mils (0-02), the scale must be adjusted.

c. To adjust elevation scale for fine adjustment.

(1) Loosen the set screw holding the adjusting screw 13 by two turns.(fig. 19).

(2) Loosen screw 13 by one turn.

(3) Hold elevation knob with right hand. Turn the graduated ring with left hand until the graduation 0 coincides with the index.

(4) Check with the quadrant to insure that the barrel has not been displaced.

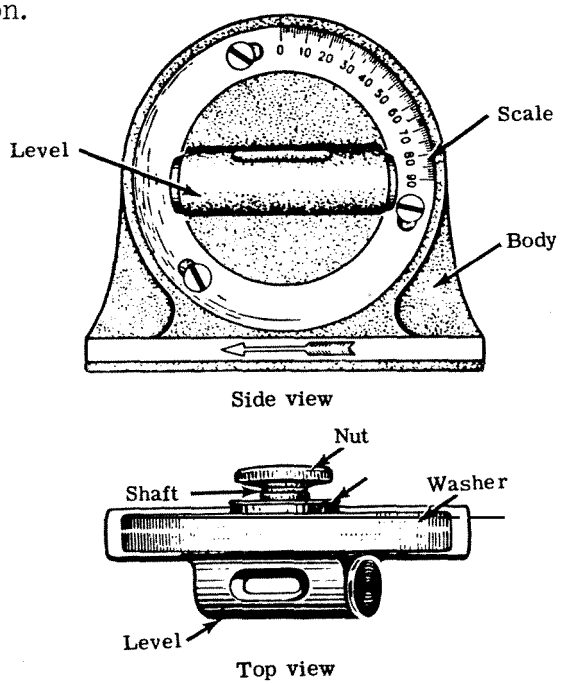
(5) Tighten screw 13 and tighten its set screw.

d. To adjust elevation scale for rough adjustment. If the index of the elevation scale for rough adjustment does not coincide with the graduation scale 10, the following is necessary:

(1) **МП-41 (MP-41) sight.** Loosen the screws of the scale by unscrewing them a half turn and set the graduation 10 opposite the index. Tighten the screws.

(2) **МП-42 (MP-42) sight.** Loosen the screw of the index and set the index opposite the graduation 10. Tighten the screw.

e. Gunner's mortar quadrant. This quadrant (fig. 30) is used to insure that the mortar barrel is at 45° elevation when checking the elevation scale deviation. It can be used, in emergencies, when no sight is available, for a rough check of the elevation of the barrel in the firing position.



OIP 1342

Figure 30. Soviet mortar quadrant, KM1.

SECTION VII. OPERATING INSTRUCTIONS---1937 MODELS.

29. GENERAL. The operation of the 1937, 1941, and 1943 model mortars differ considerably, primarily because of the addition of wheels on the later models. This section presents a detailed description of the operation of the model 1937 mortars (figs. 1, 2, and 3).

30. EXAMINATION BEFORE FIRING.

a. Remove mud, dirt, and grease.

b. Check all parts of materiel for damage and missing parts or corrosion. Correct any deficiency. Give particular attention to shock absorber, elevating mechanism, and traversing mechanism. (See section IX.)

c. Remove barrel and clean.

d. Disassemble barrel.

e. Clean firing pin, and make sure that it is in serviceable condition.

f. Assemble the mortar.

g. Operate the elevating, traversing, and cross-leveling mechanisms for proper functioning.

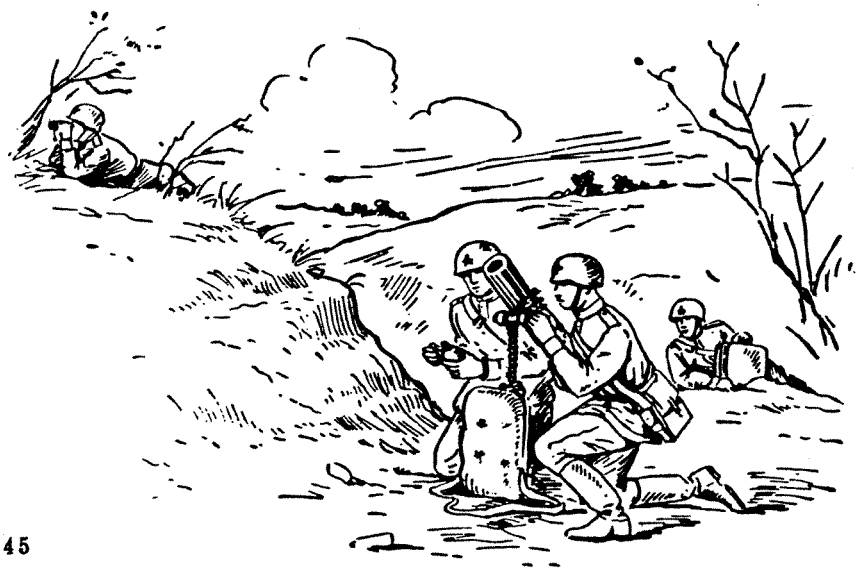
h. Check auxiliary equipment for completeness and serviceability.

31. EMPLACEMENT.

a. Select a well-concealed position (defilade, woods, trench, etc.).

b. Emplace weapon (fig. 31) on medium firm ground (clay soil, black earth, or ground overgrown with grass), if possible. Soft soil (loose sand or marshy soil) will require sand bags or twigs under base plate for stability (fig. 32). Hard ground (rocky or frozen ground) will require breaking up the soil.

c. The base plate should be emplaced so that it will not settle more than allowed by the shock absorber. If the base plate settles more than this, parts of the mortar will break or become distorted. The inclination of the base plate, with respect to the horizontal plane, should be about 25° to 30°; the base plate should slope toward the direction of fire (fig. 33).



OIP 1345

Figure 31. Mortar in firing position.

d. The spades under the feet of the bipod should be embedded into the ground as far as their flanges and should be approximately on a level with the spherical heel of the base cap. The spades of the bipod should be 42-1/2 inches (1080-mm) from the center of the base plate for elevations up to 65°. For greater angles of fire, move the bipod closer to the base plate.

32. LAYING.

a. General. Install the sight, if it is not already on the weapon (see section VI). Operate the controls of the sight to make sure that they are functioning properly.

b. Rough cross-leveling.

(1) Rotate handle of the rough cross-leveling mechanism counterclockwise (fig. 34).

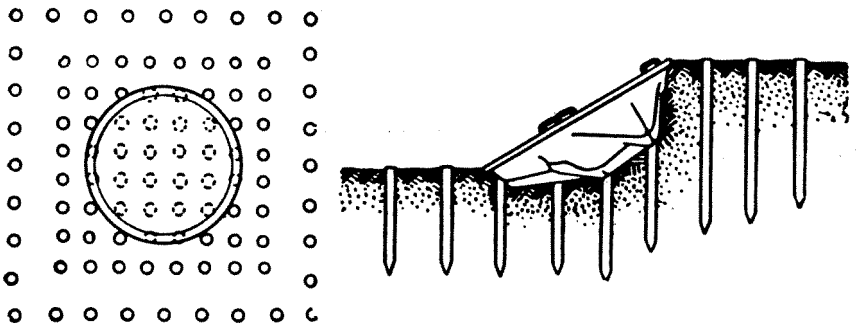
(2) Slide the mechanism up or down, as is necessary, to level the weapon.

(3) Tighten by rotating the handle in clockwise direction.

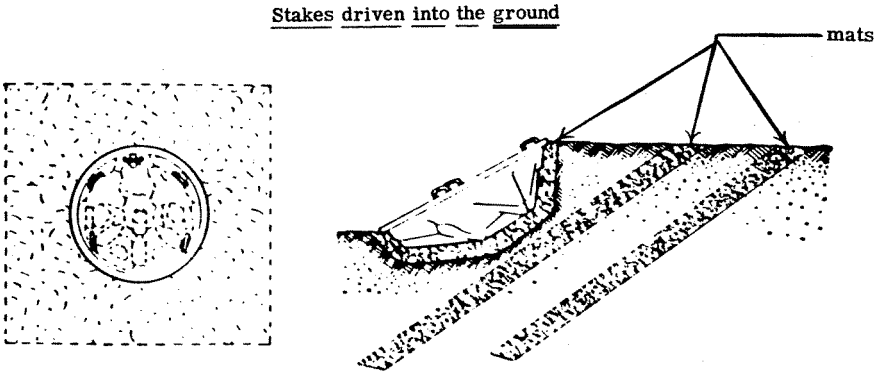
c. Accurate cross-leveling.

(1) **Model 1937, new type.** Turn the adjusting screw (fig. 34).

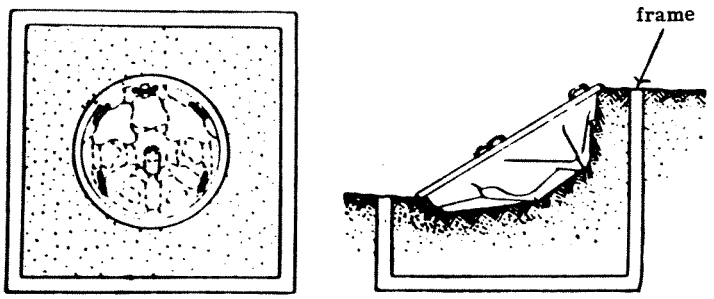
(2) **Model 1937, 1942-1943 version.** Rotate the turnbuckle between the right leg of the bipod and the elevating mechanism housing.



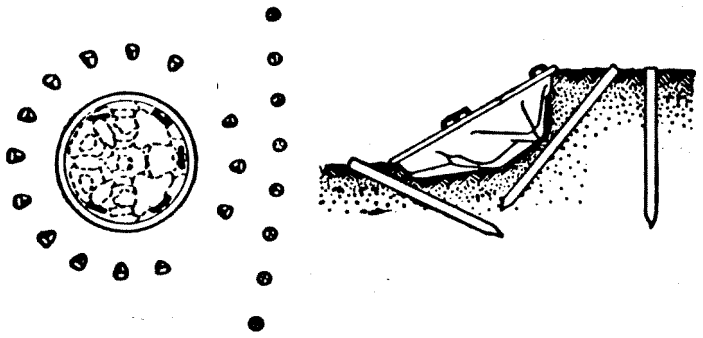
Stakes driven into the ground



Mats made of twigs



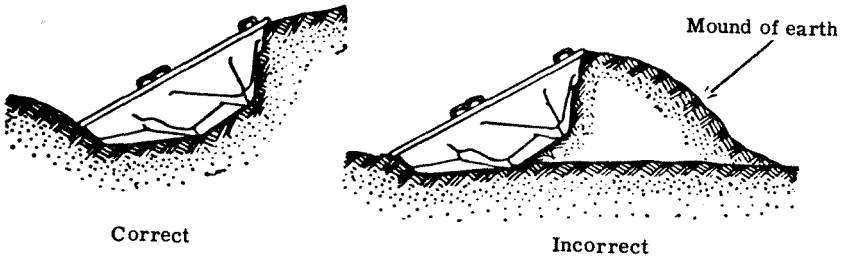
Wooden frame under base plate



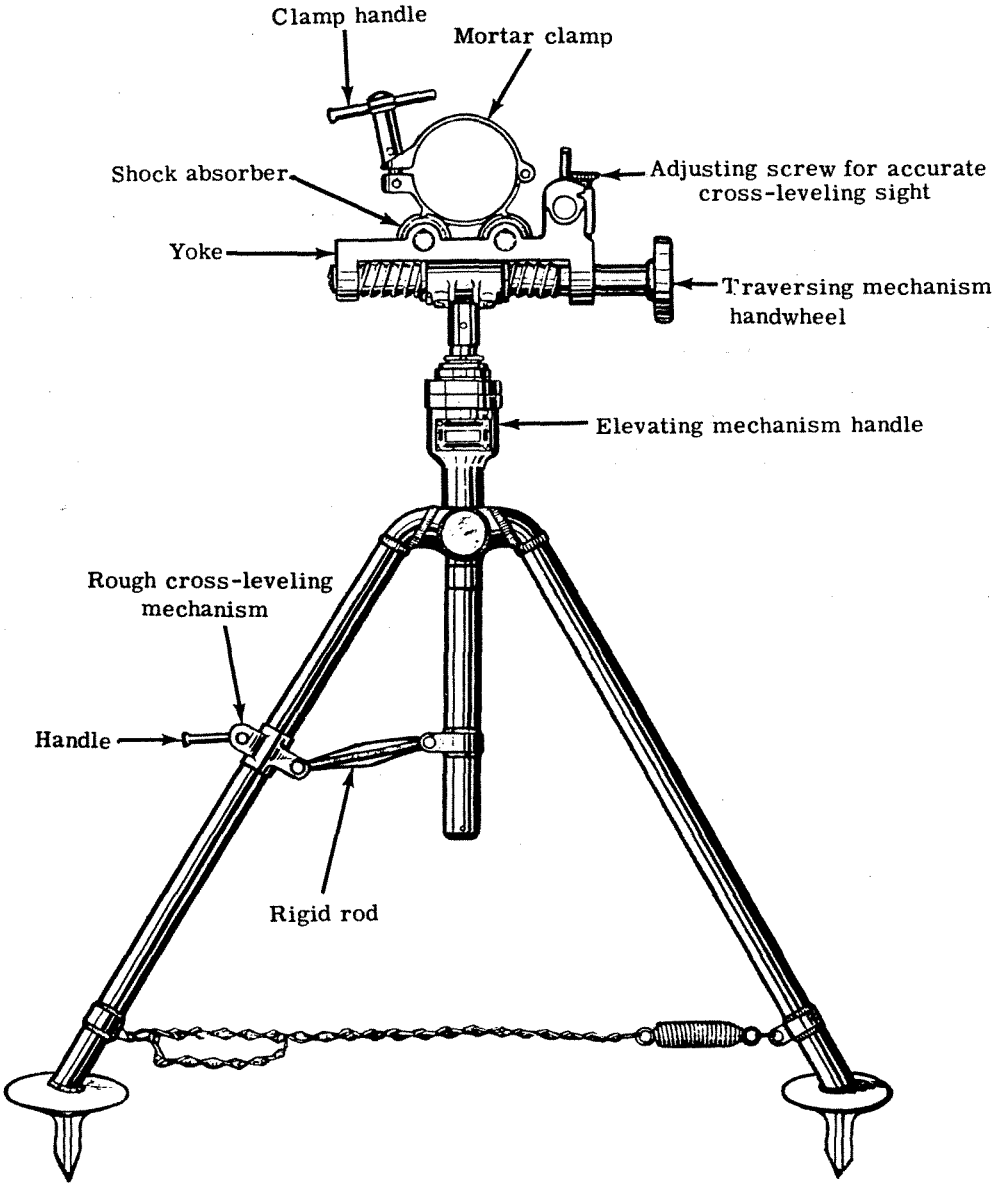
Stakes driven in to form a cone

OIP 1343

Figure 32. Reinforcement of ground under base plate.



OIP 1344 Figure 33. Emplacement of base plate.



OIP 1346 Figure 34. Bipod mount, model 1937, new type.

(3) **Model 1937, old type.** Rotate the turnbuckle on the right leg of the bipod.

d. Final steps.

(1) Set the sight at the prescribed angle of elevation with its elevating mechanism.

(2) Bring the bubble of the longitudinal level of the sight into the center by using the elevating mechanism of the mortar.

(3) Set the prescribed deflection on the sight, and aline the sight with the aiming point.

(a) If the angle at which it is necessary to traverse the barrel of the mortar is greater than the movement permitted by the traversing mechanism, but does not exceed it by more than 300 mils (3-00) of the azimuth scale, the bipod should be readjusted.

(b) If this angle exceeds 300 mils (3-00), the following must be done: the bipod must be readjusted and the base plate must be turned in the same direction so that the slot in the supporting socket on the base plate is parallel to the direction of the barrel.

(4) Bring the bubble of the cross-level of the sight into the center by means of the accurate cross-leveling mechanism on the mortar.

(5) Check the laying of the mortar, and accurately realine the sight with the aiming point by means of the traversing mechanism, if necessary.

(6) Check all levels on the mortar and sight.

(7) The sight remains on the mortar during firing.

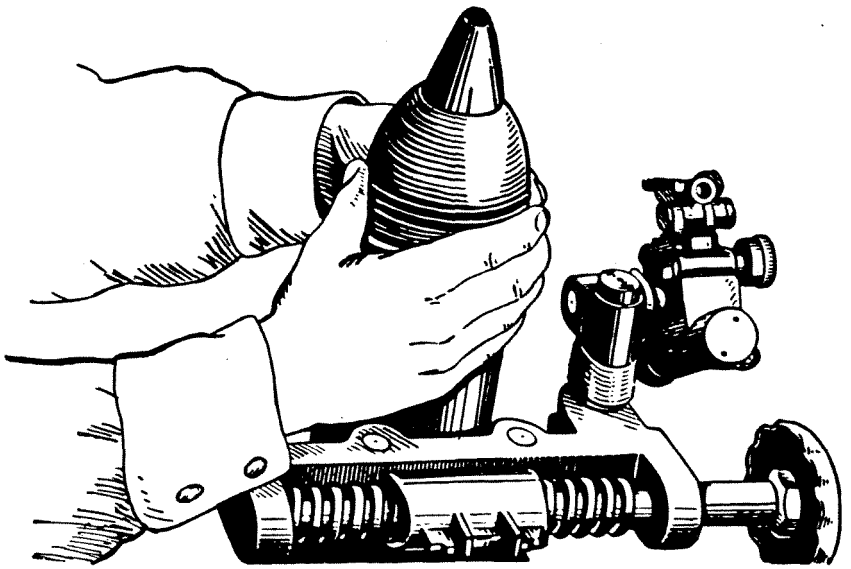
33. LOADING AND FIRING.

a. Place the required number of increment charges on the shell.

b. Remove the cap from the fuze, M1, just before loading. In order to prevent an accident, do NOT remove this cap until ready to load. (Only the fuze, M1, is equipped with a cap.)

c. Insert the shell into the muzzle of the barrel with the stabilizing fins first (fig. 35). Lower it into the barrel approximately as far as the bourrelet and release it. The loader must remove his hands from the barrel quickly after releasing shell.

d. The first shell should be fired with a small or medium charge, if practicable. This will tamp down the ground under the base plate without putting too much strain on the shock absorber.



OIP 1347

Figure 35. Loading mortar.

34. INSPECTION AND OPERATIONS DURING FIRING.

a. If the base plate settles too much, stop firing and make ground under it more solid (fig. 32).

b. If the base plate settles, it will be necessary to remove the dirt from under the spades of the bipod until they are approximately level with the base cap. If the base plate is pushed backward by the recoil, it will be necessary to readjust the bipod so that the distance between the spades and the center of the base plate is 42-1/2 inches for elevations up to 65°. For greater angles of fire, the bipod should be closer to the base plate.

c. Check all levels to make sure that the air bubbles are centered.

d. Check the sight to make sure that it is securely fastened and has not jarred loose

35. ADJUSTMENT OF TRAVERSING MECHANISM. The traversing mechanism has two adjusting sleeves to remove backlash (fig. 49). Adjustment is accomplished as follows:

a. Loosen adjusting screws.

b. Rotate sleeves slightly to remove backlash.

c. Turn traversing handwheel to make sure that the backlash is eliminated.

d. Tighten the adjusting screws.

36. ADJUSTMENT OF ELEVATING MECHANISM. The elevating mechanism has an adjusting sleeve for removing backlash (fig. 48). Proceed as follows:

a. Rotate lock nut clockwise to loosen.

b. Rotate sleeve slightly to eliminate backlash.

c. Turn elevating handle to make sure that the backlash is eliminated.

d. Tighten the lock nut.

37. IMMEDIATE ACTION IN CASE OF MISFIRE.

a. Wait at least 2 minutes, and then strike the barrel sharply with a piece of wood so that the shell, if stuck, will drop down.

b. If the mortar still fails to fire, wait at least 1 minute before preparing to unload.

38. UNLOADING.

a. Depress the barrel to the lowest angle (about 45°) using the elevating mechanism.

b. Have two men approach mortar from behind, one on each side.

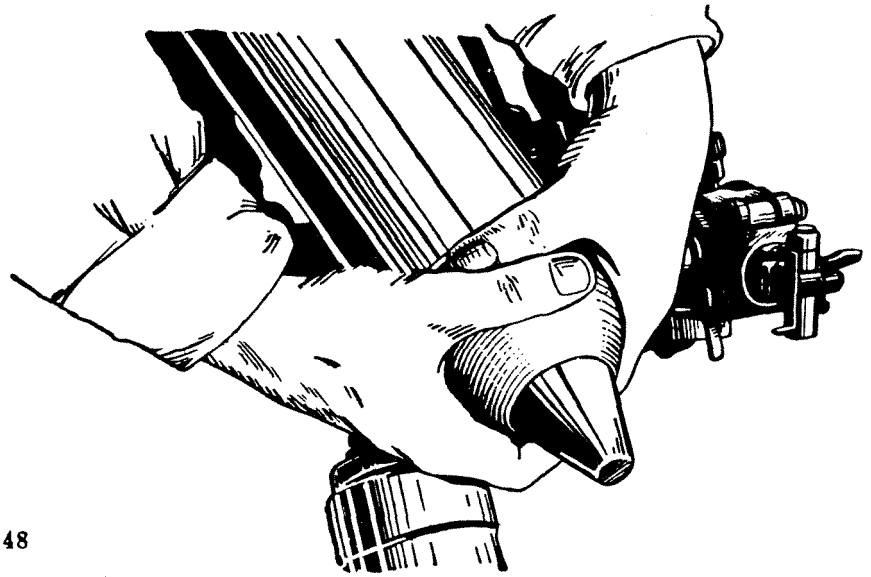
c. Loosen mortar clamp (fig. 34) by rotating clamp handle. Do NOT remove clamp.

d. Rotate barrel 90°.

e. Remove barrel from base plate. Avoid jolting barrel.

f. Hold bipod and raise base cap. After raising base cap, do NOT lower it while the shell is still in barrel.

g. Have one member of the crew place his hand over the muzzle to prevent the shell from dropping out. (The fuze may function if the shell hits the ground.) He should stand on the right side of the mortar and behind the muzzle. As soon as the shell comes in contact with his hands, he should remove it from the tube (fig. 36), being careful not to touch the fuze.



OIP 1348

Figure 36. Unloading mortar.

h. Place cap on fuze (only M1 fuze has cap) immediately after removing shell from mortar.

i. See section X for causes of misfires.

39. FIRING POSITION TO TRAVELING POSITION.

a. Disassembly. Disassemble the mortar into three separate loads consisting of the barrel, bipod mount, and base plate.

(1) Turn mortar clamp handle counterclockwise a few turns (fig. 34).

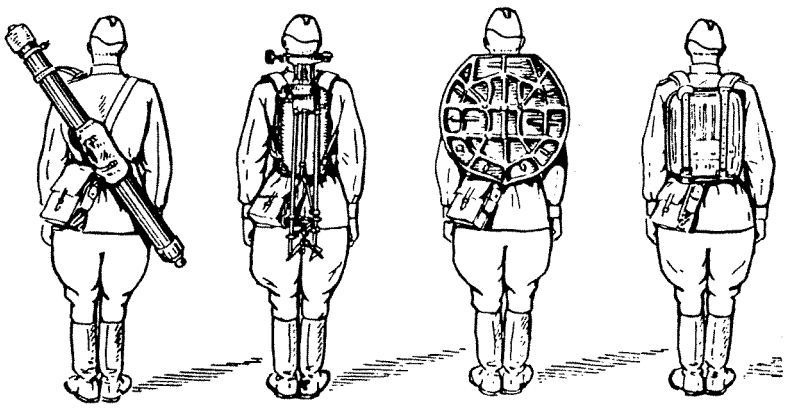
(2) Open the mortar clamp while holding the bipod so that it will not fall.

(3) Separate barrel and bipod mount. Lay bipod mount aside.

(4) Rotate barrel 90° so that flat sides of base cap are parallel to flat sides of base socket of base plate.

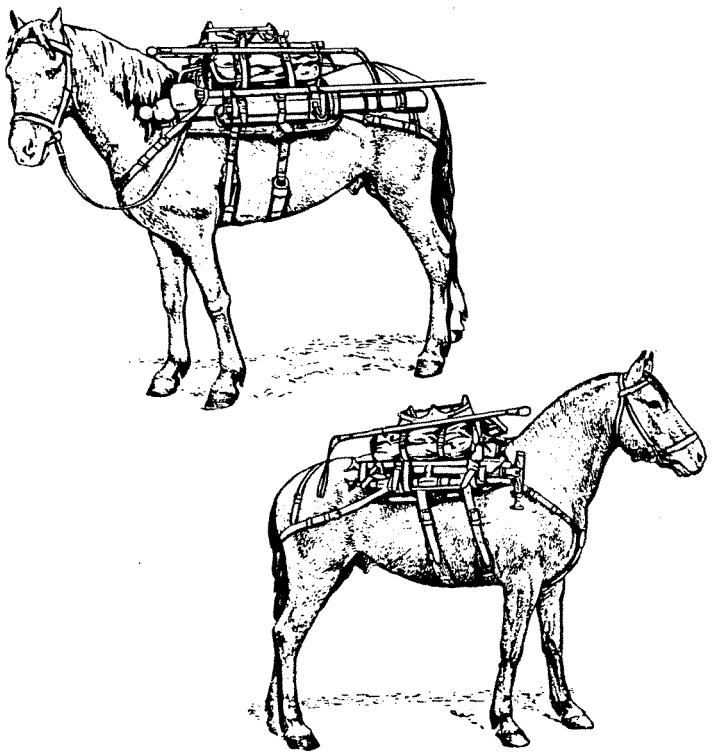
(5) Remove barrel by lifting base cap from socket in base plate.

b. Transportation. The mortar may be placed in a hand cart or trailer, it may be man-carried (fig. 37), or it may be transported by pack animals (fig. 38).



OIP 1349

Figure 37. Carrying 1937 mortar.



OIP 1350

Figure 38. Pack animals carrying 1937 mortar.

SECTION VIII. OPERATING INSTRUCTIONS---MODELS 1941 AND 1943.

40. EXAMINATION BEFORE FIRING. This phase of operation is the same as that for the 1937 models.

41. EMPLACEMENT. Emplacement is similar to that for the model 1937 mortars, with the following exceptions:

a. Model 1941. Remove wheels, proceeding as follows:

(1) Rotate lock pawl 90° to a position perpendicular to the wheel (fig. 39).

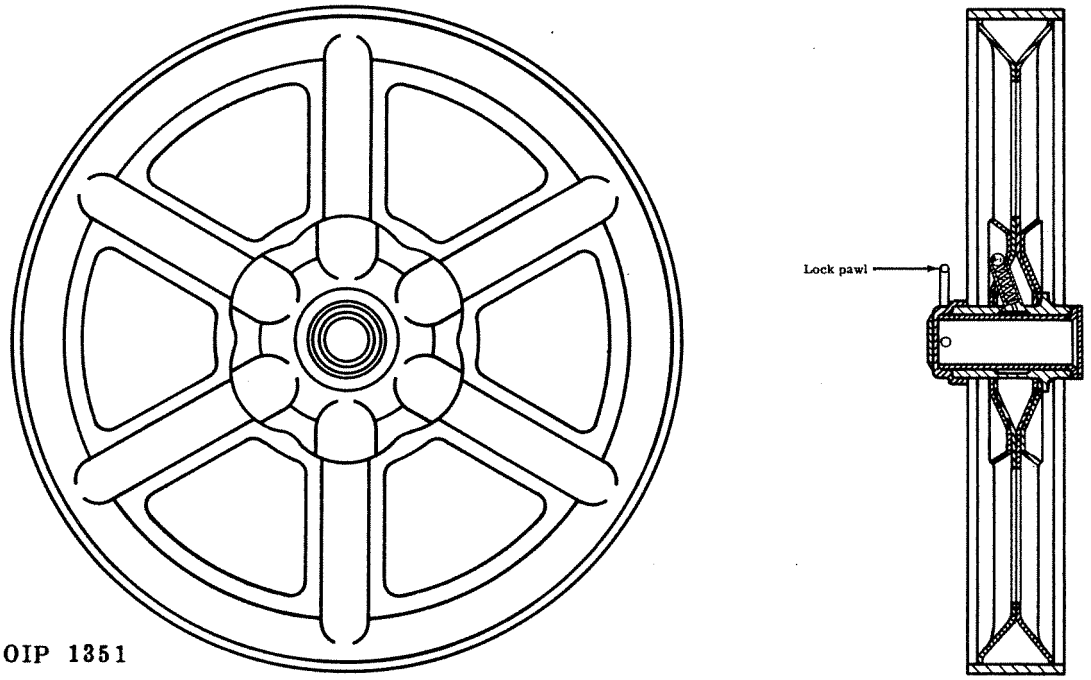


Figure 39. Wheel for 1941 mortar. Lock pawl

(2) Remove wheels.

b. Model 1943.

(1) It is not necessary to remove wheels. The mount is emplaced by pressing the spades of the firing jacks into the ground while the wheels are lifted off the ground.

(2) The spades of the mount should be 50 inches (1275-mm) from the center of the base plate for elevations up to 65°. For greater angles of fire, the mount will be located closer to the base plate.

42. LAYING.

a. General. Install the sight, if it is not already on the weapon (section VI). Operate the controls of the sight to make sure they are functioning properly.

b. Rough cross-leveling.

(1) Model 1941. Push rough cross-leveling mechanism handle (fig. 40) against the elevating mechanism housing and rotate to right or left, according to which direction housing is tilted.

(2) Model 1943. Turn handle (fig. 41) to right or left to cross-level the mortar.

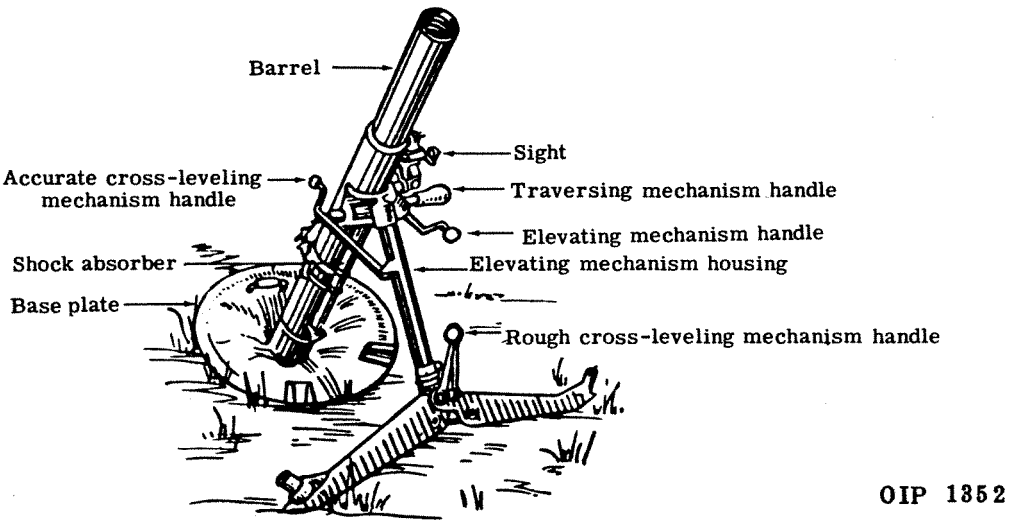
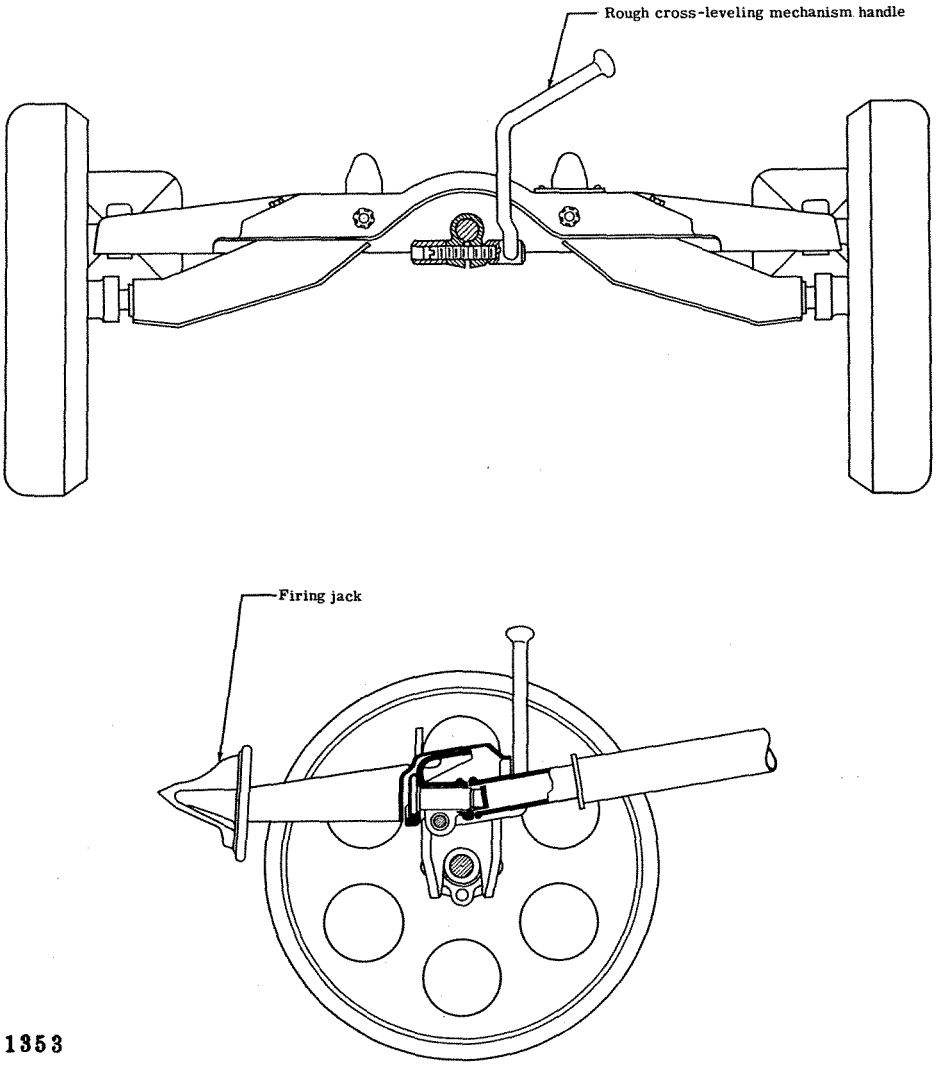


Figure 40. 1941 mortar in firing position.

43. LOADING AND FIRING. Identical to model 1937 mortars. In addition, make sure that the eccentric handle of the safety device is in the FIRE position (fig. 42).

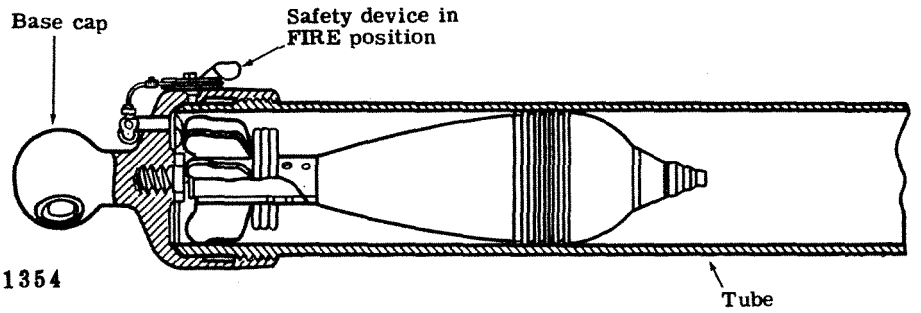
44. INSPECTION AND OPERATION DURING FIRING. These functions are the same as for the 1937 models, except that the distance between mount and center of base plate is 50 inches (1275 mm) for elevations up to 65°.

45. ACTION IN CASE OF MISFIRE. In the event of a misfire, proceed the same as for the 1937 models.



OIP 1353

Figure 41. Rough cross-leveling mechanism, 1943 mortar.



OIP 1354

Figure 42. Cross section of mortar barrel, models 1941 and 1943.

46. UNLOADING.

a. In the base cap there is a safety device to prevent the shell from touching the firing pin (fig. 42).

b. Rotate the eccentric handle of the safety device through 180°, if it is in the FIRE position. This will cause the shell to be raised slightly so that it cannot touch the firing pin.

c. Proceed to remove the shell as described for the 1937 models.

47. FIRING POSITION TO TRAVELING POSITION.

a. Close legs and lock in position (fig. 43).

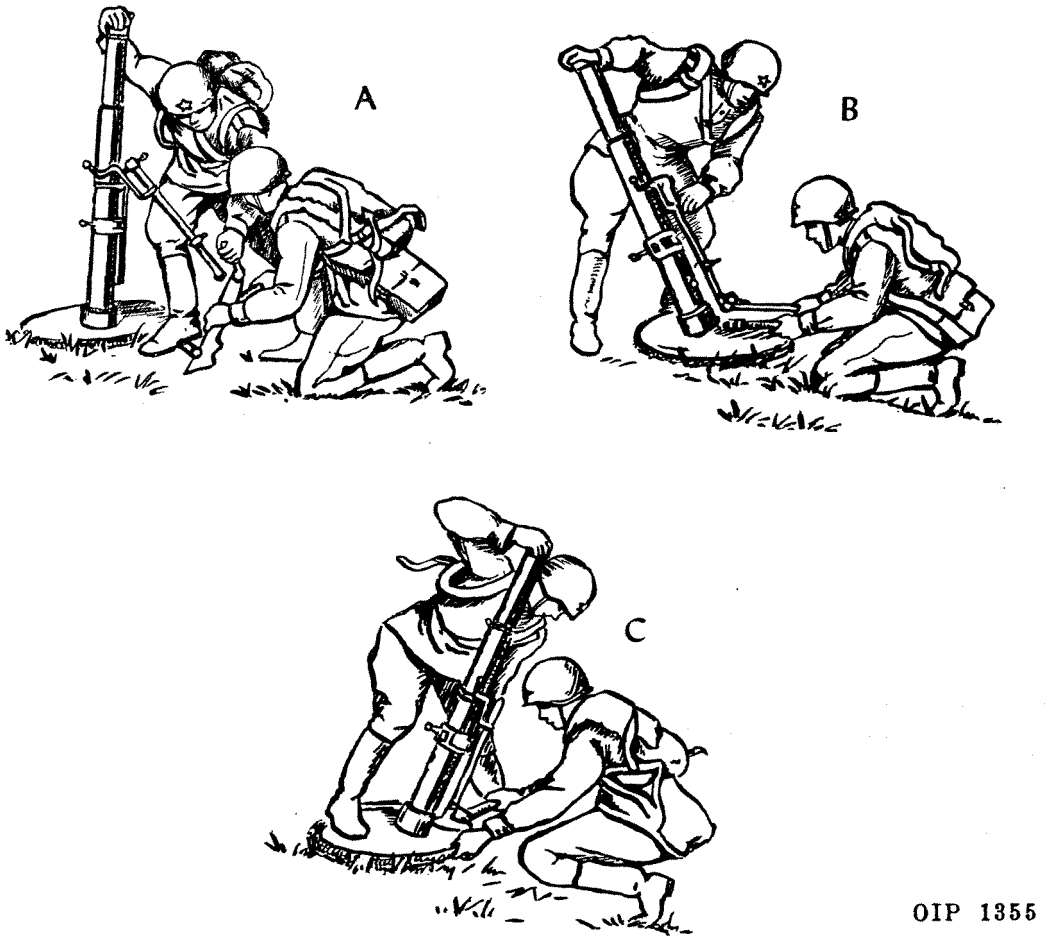


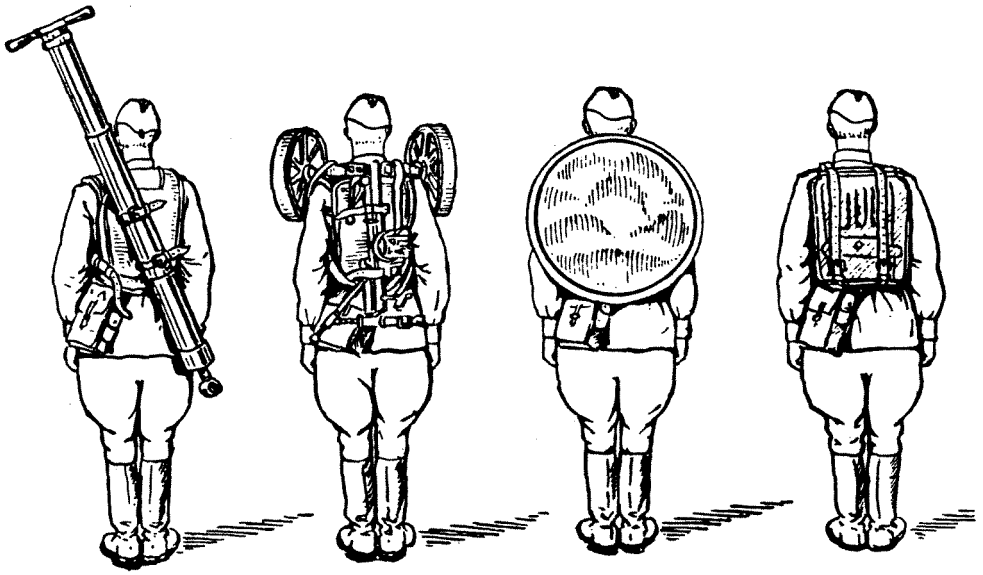
Figure 43. Folding mount, model 1941.

b. Replace wheels of model 1941 mortar.

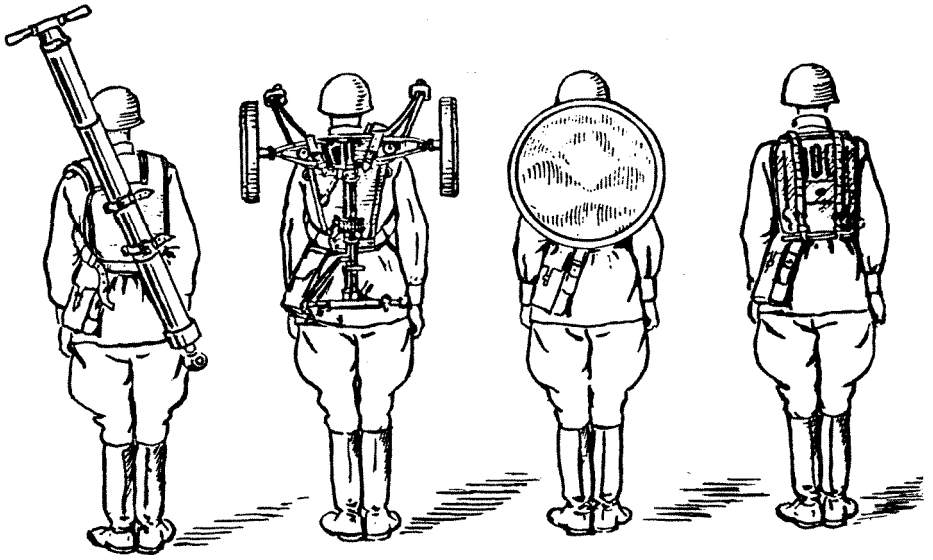
c. Install cover to protect barrel from dirt and dust and to provide a handle for towing.

d. Disassemble in same manner as 1937 models (par. 38).

e. The mortar may be carried by hand or pack animal, or it may be towed (figs. 44, 45, and 46).



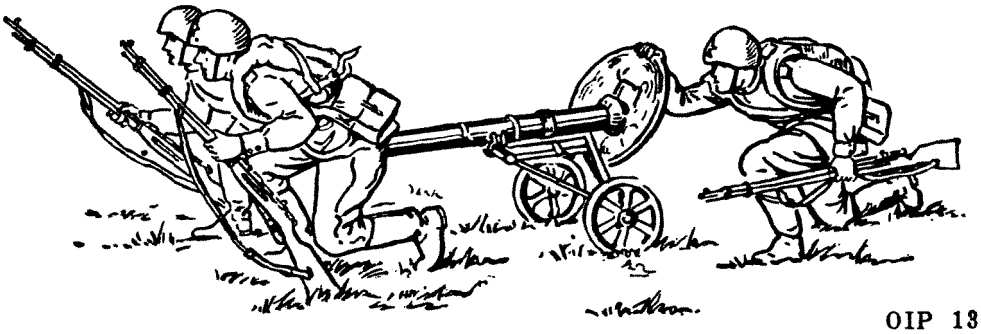
Model 1941



OIP 1356

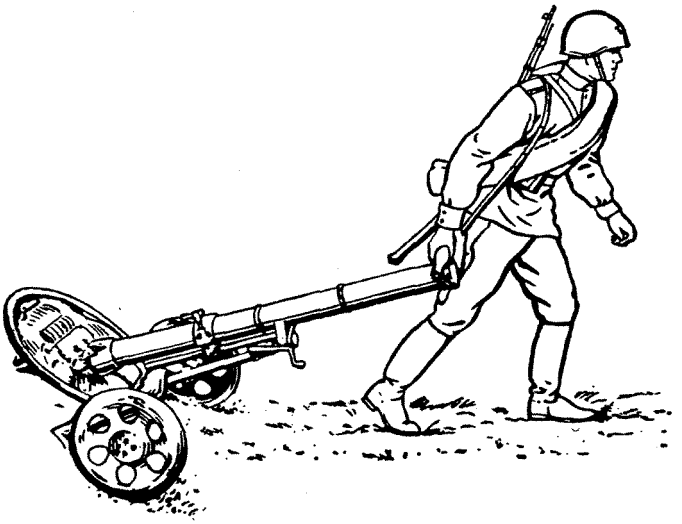
Model 1943

Figure 44. Carrying mortar, models 1941 and 1943.



OIP 1357

Figure 45. Towing model 1941 mortar.



OIP 1358

Figure 46. Towing model 1943 mortar.

SECTION IX. MAINTENANCE

48. MODELS 1937. For all maintenance not covered in this paragraph, turn mortar over to Ordnance for repair.

a. Barrel. The barrel is disassembled for inspection, cleaning and replacement of the firing pin and obturating ring. The disassembly steps are as follows:

(1) Remove barrel from mount and base plate. (See section VII.)

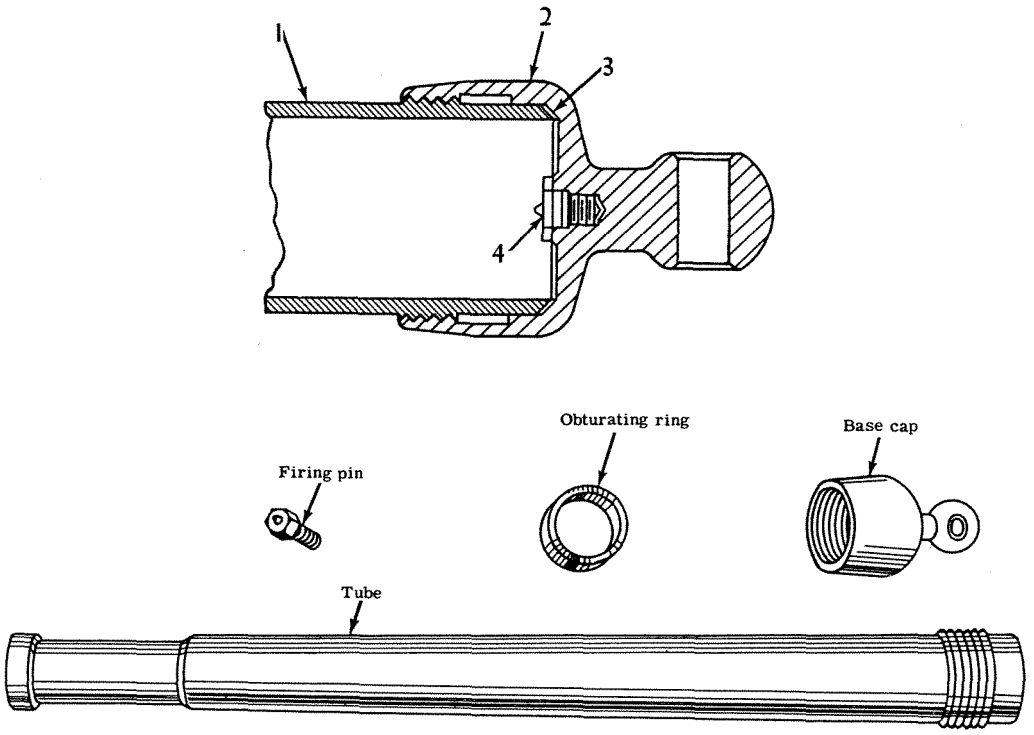
(2) Insert crowbar in hole in base cap.

(3) Hold tube lightly with both hands near base cap.

(4) Tap crowbar lightly with hammer and rotate counterclockwise.

(5) Remove firing pin by rotating it counterclockwise with wrench.

(6) Remove obturating ring, if necessary.



OIP 1359

Figure 47. Model 1937 barrel, disassembled.

b. **Rough cross-leveling mechanism.** Do not disassemble.

c. **Accurate cross-leveling mechanism.** Do not disassemble.

d. **Elevating mechanism.** The mechanism is disassembled for inspection and cleaning (fig. 48). Before disassembling, remove the bipod mount from the mortar tube. Dissassembly is as follows; assembly is performed in reverse order.

(1) Unscrew set screw in pinion cover.

(2) Unscrew pinion cover from housing.

(3) Remove elevating screw, pinion, cover and associated parts from housing.

(4) Knock out plug pin from bottom plug.

(5) Remove bottom plug from housing.

(6) Knock out plug pin from handle plug.

(7) Unscrew handle plug from handle.

(8) Remove handle and gear from elevating mechanism housing.

(9) Remove ring from gear.

e. Traversing mechanism. This mechanism is disassembled in order to replace parts (fig. 49). Disassembly is as follows; assembly is performed in reverse order.

(1) Unscrew end screw and conic nut.

(2) Turn handwheel and unscrew traversing screw from housing, removing traversing screw from yoke lugs.

(3) Remove stake screw of handwheel, then unscrew handwheel from traversing screw.

f. Shock absorber. The shock absorber is disassembled to replace a broken spring (fig. 50). Disassemble it by proceeding as follows; assembly is performed in reverse order.

(1) Remove bipod mount from barrel.

(2) Loosen nuts by one or two turns and unscrew cylinders from rear cover of shock absorber.

(3) Unscrew stake screw with screwdriver.

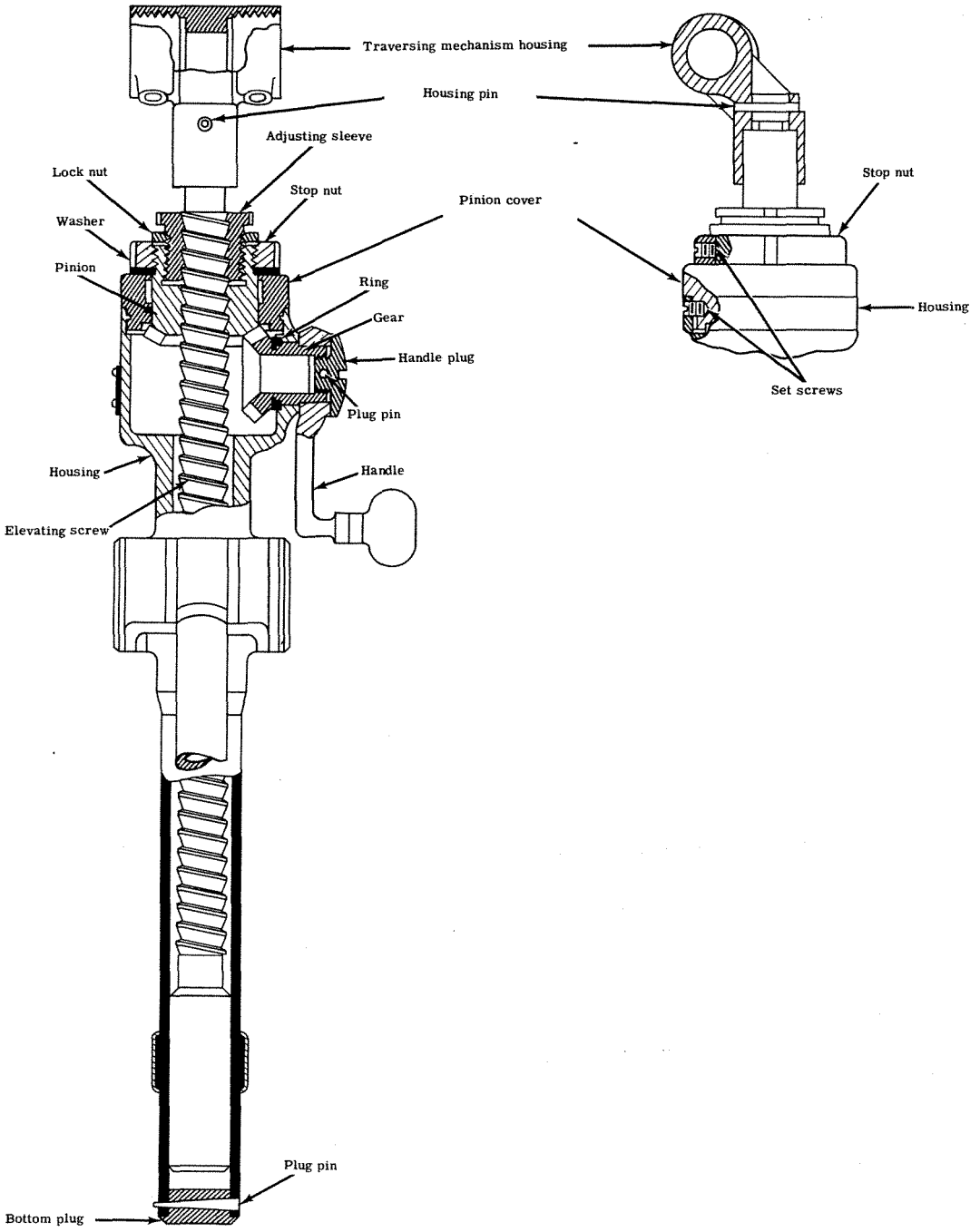
(4) Unscrew pistons from yoke (fig. 51).

(5) Remove pistons and springs from cylinder.

(6) Remove springs and cylinder parts.

49. MODELS 1941 AND 1943. For all maintenance not covered in this paragraph, turn mortar over to Ordnance for repair.

a. Barrel. The barrel is disassembled for inspection, cleaning, and replacement of firing pin, obturating ring, and safety device. The



OIP 1360 Figure 48. Elevating mechanism, model 1937 mortar.

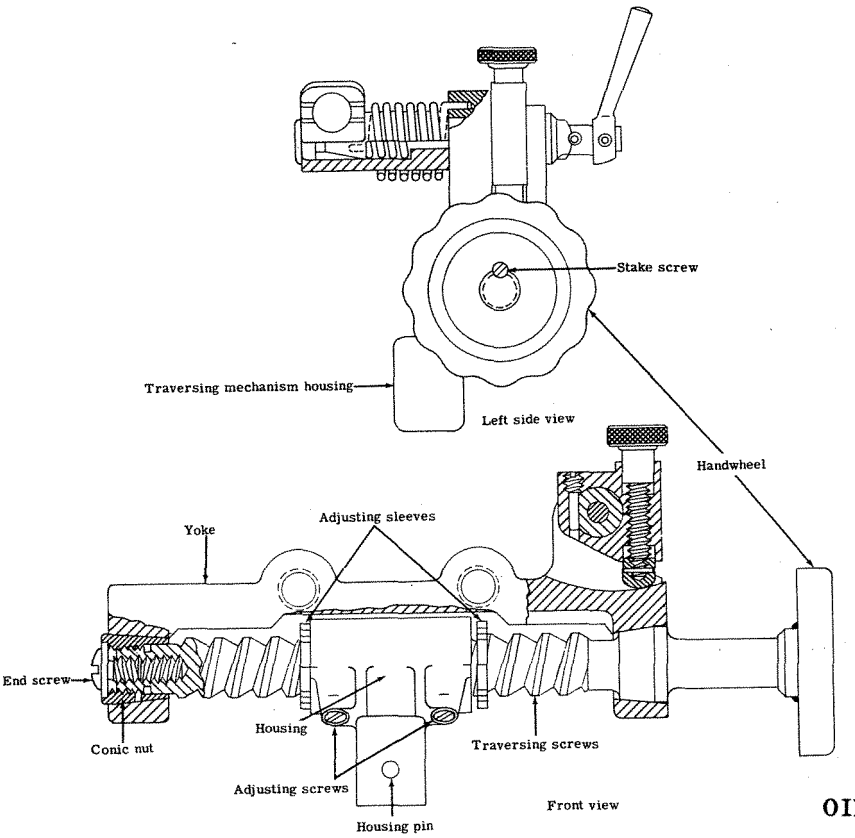


Figure 49. Traversing mechanism, model 1937, new type.

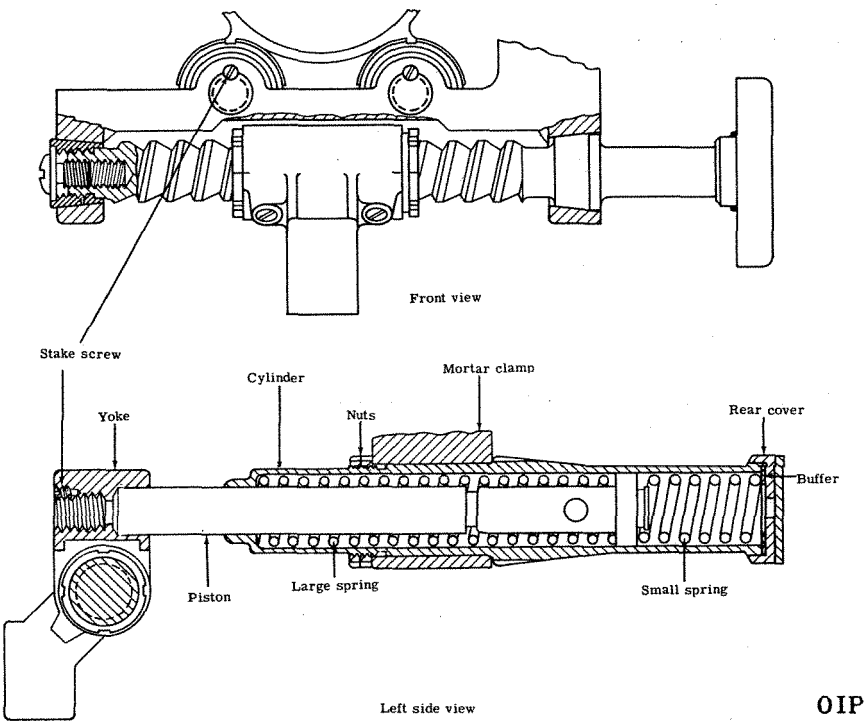
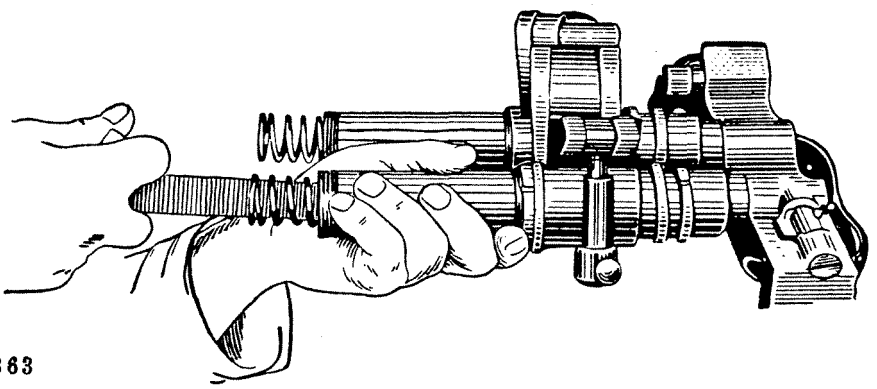


Figure 50. Shock absorber, model 1937 mortar.



OIP 1363

Figure 51. Removing pistons from shock absorber, model 1937 mortar.

barrel is disassembled as follows; assembly is performed in reverse order.

(1) Remove barrel from mount and base plate. (See paragraph 38.)

(2) Insert crowbar in hole in base cap.

(3) Hold tube tightly with both hands near base cap.

(4) Strike crowbar lightly with hammer, rotate base cap one full turn counterclockwise, and remove.

(5) Remove firing pin by rotating it counterclockwise with wrench.

(6) Remove obturator ring, if necessary.

(7) Disassemble safety device (fig. 52), if parts need replacement or cleaning. This is done as follows:

(a) Remove nut with screwdriver.

(b) Remove cam.

(c) Lift up pin.

(d) Remove spring.

(e) Remove shaft.

b. Rough cross-leveling mechanism. The mechanism is disassembled for cleaning and replacement of parts (fig. 53). Disassembly

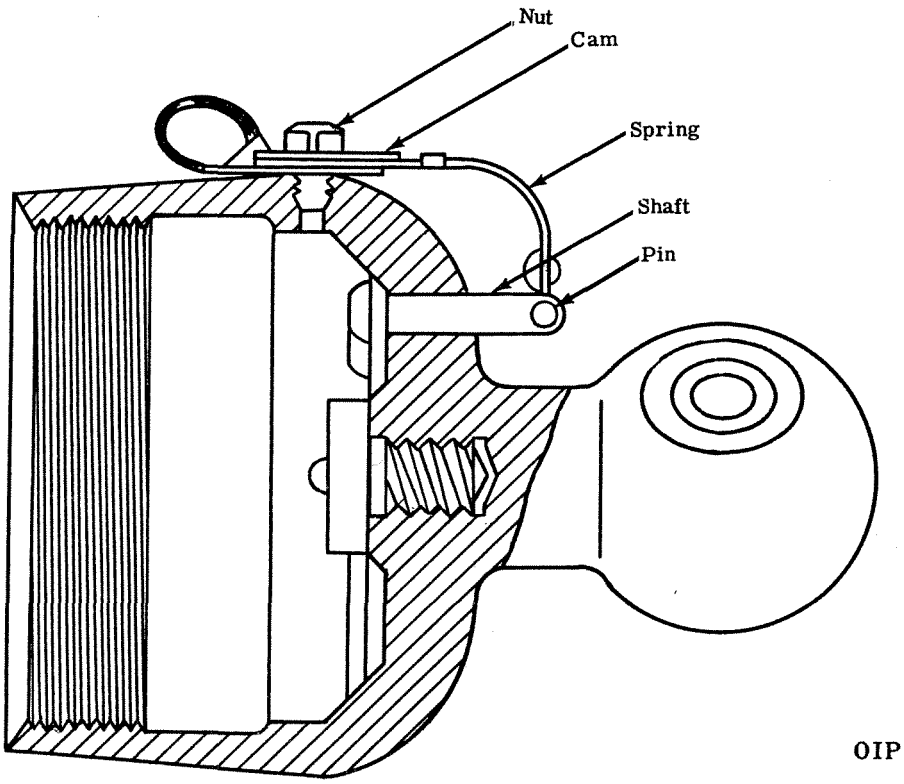


Figure 52. Base cap, models 1941 and 1943.

is accomplished as outlined below; assembly is performed in reverse order.

(1) Remove set screw.

(2) Knock out axle.

(3) Remove handle and washer.

(4) Remove housing screw.

(5) Remove cam from housing.

(6) Remove housing.

c. Accurate cross-leveling mechanism. This mechanism is disassembled for cleaning and replacement of parts (fig. 54). Disassembly is described as follows; assembly is performed in reverse order.

(1) Knock out pin.

(2) Hold screw to prevent it from rotating and unscrew handle.

(3) Remove lug from screw.

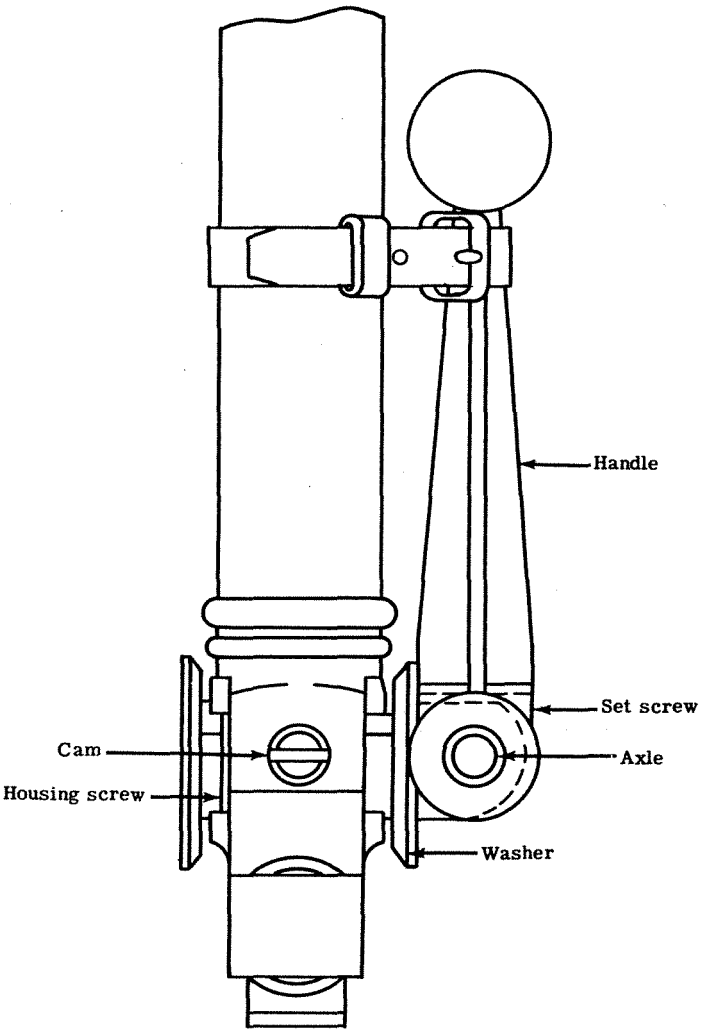
(4) Unscrew lug from sleeve 1. (This completes removal of the accurate cross-leveling mechanism from the traversing mechanism.)

(5) Turn screw completely into housing.

(6) Unscrew housing from sleeve 2. (This completes removal of the accurate cross-leveling mechanism from the elevating mechanism.)

(7) Loosen end screw and remove collar.

(8) Remove screw from housing.



OIP 1365

Figure 53. Rough cross-leveling mechanism, model 1941 mortar.

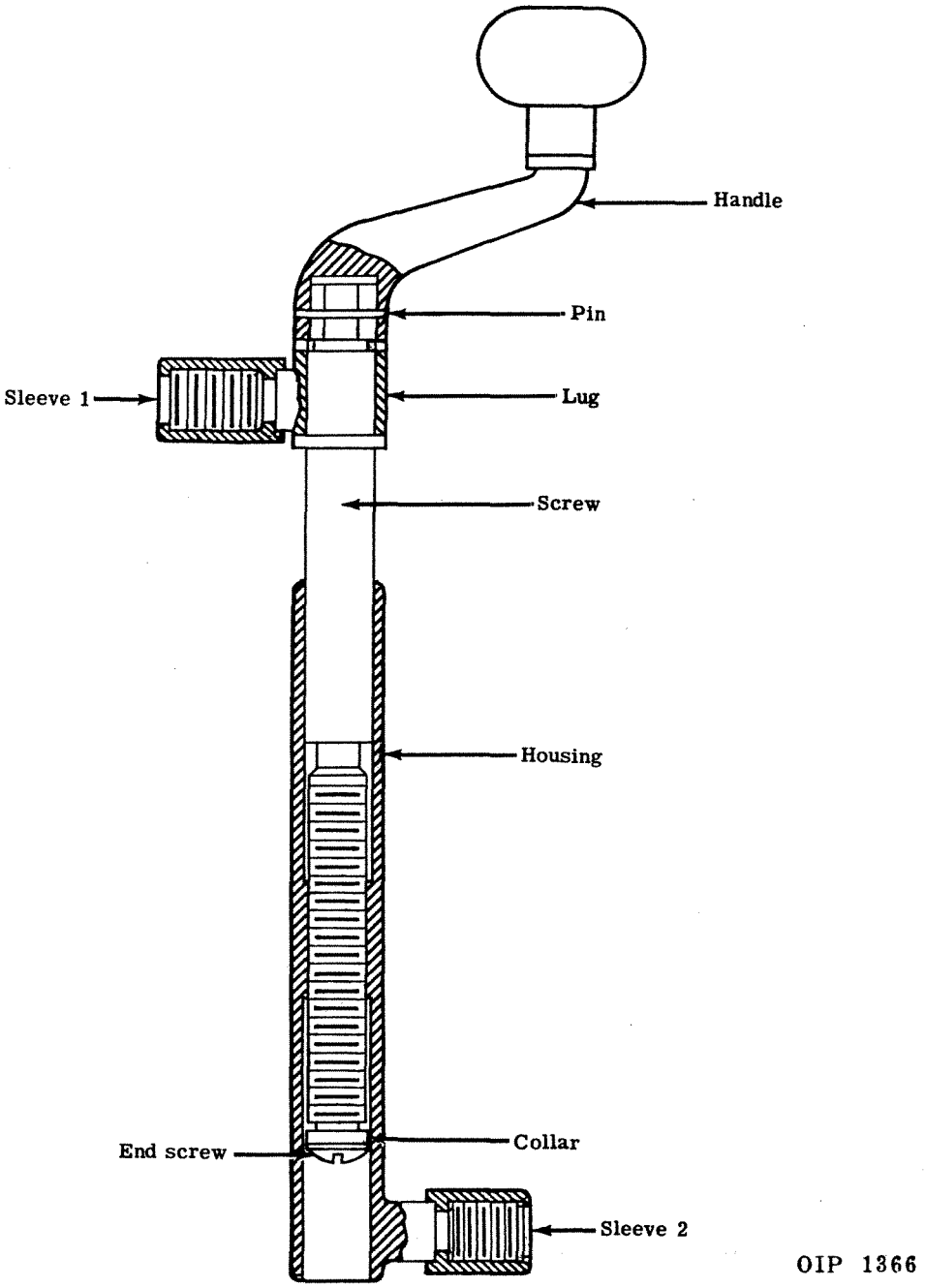


Figure 54. Accurate cross-leveling mechanism, models 1941 and 1943.

d. Elevating mechanism. This mechanism is disassembled for cleaning and replacement of parts (fig. 55).

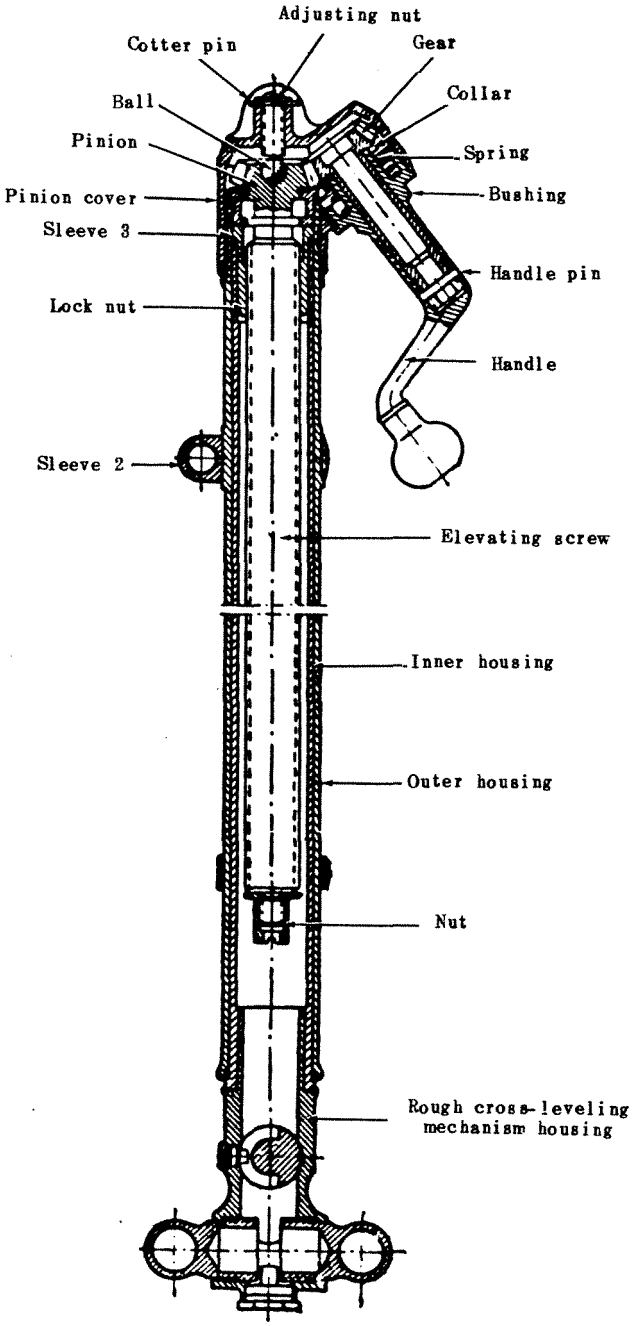
(1) Disassembly

(a) Remove both rough and accurate cross-leveling mechanisms as prescribed above.

(b) Unscrew nut and elevating screw with a long screwdriver.

(c) Rotate handle and remove outer housing, together with pinion cover.

(d) Partially unscrew lock nut, as well as the outer housing, together with the elevating screw.



OIP 1367

Figure 55. Elevating mechanism, model 1941 mortar.

(e) Remove screw from ball.

(f) Unscrew sleeve 3 and bushing from pinion cover.

(g) Knock out handle pin and unscrew handle.

(h) Remove gear from housing.

(i) Remove spring and collar.

(j) Remove cotter pin and unscrew adjusting nut.

(k) Unscrew pinion cover from cradle (fig. 56) which connects the elevating mechanism with the traversing mechanism, and remove the spring.

(2) Assembly. Perform in the reverse order of disassembly. Proceed with care when assembling the components. The outer housing, for example, should be screwed on so as not to tilt the elevating mechanism and so that sleeve 2 is level and in position to assemble to the accurate cross-leveling mechanism.

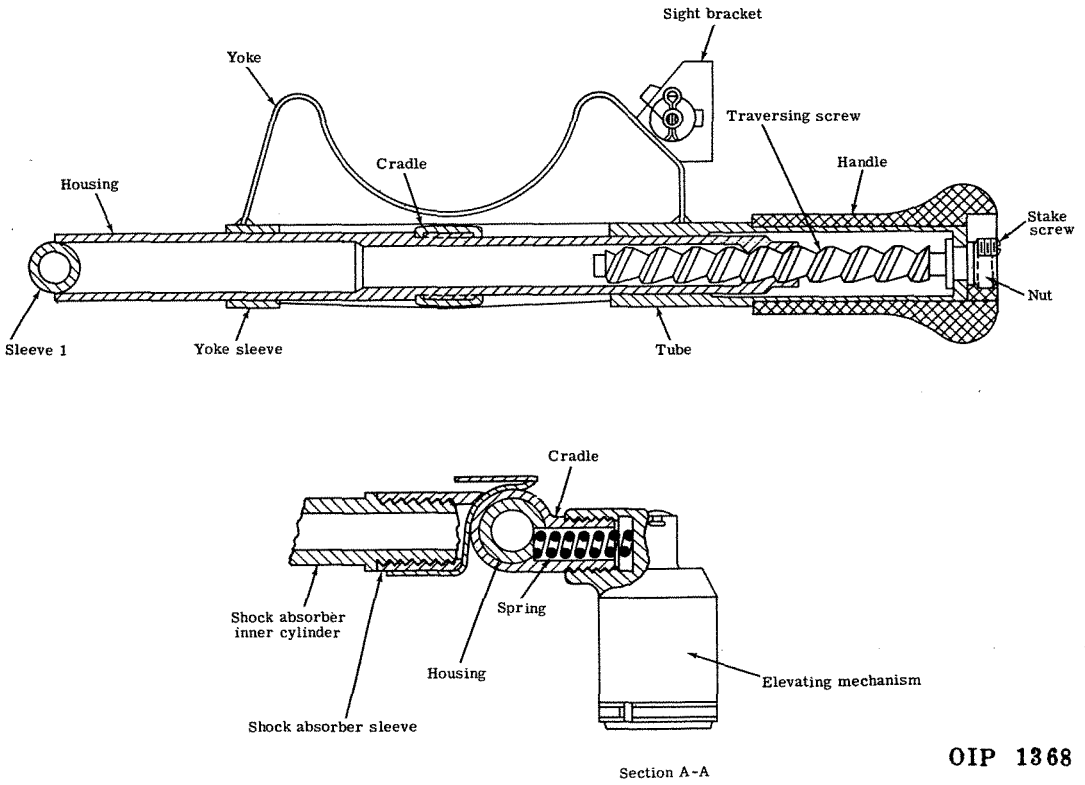


Figure 56. Traversing mechanism, model 1941 mortar.

e. Traversing mechanism. This mechanism is disassembled for cleaning and replacement of parts (fig. 56). Disassembly is performed as outlined in the following, while assembly is done in reverse order.

(1) Remove the accurate cross-leveling mechanism from the traversing mechanism as prescribed above.

(2) Separate traversing mechanism from elevating mechanism by unscrewing cradle from elevating mechanism. Remove spring from cradle.

(3) Unscrew set screw, nut, and handle.

(4) Remove nut from tube.

(5) Unscrew housing and traversing screw from cradle from the right side.

(6) Unscrew housing from traversing screw.

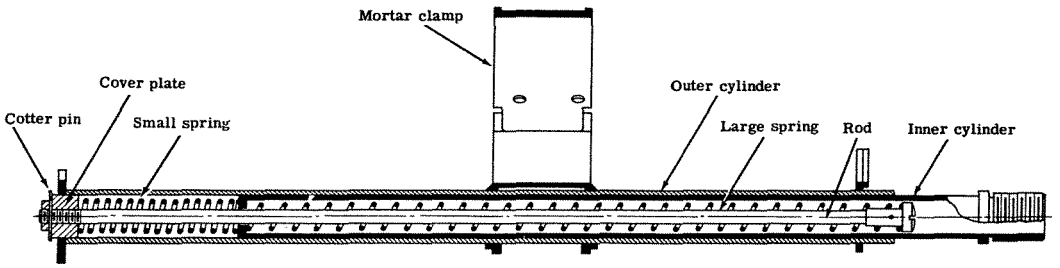
f. Shock absorber. This shock absorber is disassembled to replace a broken spring. Disassembly procedure is as outlined below; assembly is performed in reverse order.

(1) Remove mount from mortar tube.

(2) Unscrew inner cylinder from shock absorber sleeve (fig. 56).

(3) Knock out cotter pin (fig. 57).

(4) Unscrew rod. Exercise care during this operation, because rod may be suddenly knocked out from cylinder, if the large spring is compressed.



OIP 1369

Figure 57. Shock absorber, models 1941 and 1943.

(5) Remove inner cylinder with rod and large spring from outer cylinder.

(6) Remove small spring.

(7) Remove rod and large spring from inner cylinder.

SECTION X. TROUBLE SHOOTING

50. GENERAL. For all malfunctions not covered in this section, turn the mortar over to Ordnance for repair.

51. MISFIRE. If a misfire occurs, remove the shell from the mortar (sections VII and VIII), making certain that all the increment charges attached to the shell before loading are still on it and intact. Examine the fuze carefully to determine if its membrane was injured during unloading (fig. 14). Replace the safety cap on M1 fuze.

Probable cause	Remedy
Firing pin worn or broken. This if characterized by a very small indentation on the percussion cap or the absence of any indentation.	Replace firing pin.
Eccentric or damaged tube.	Replace tube.
Dirt in the barrel.	Clean bore and firing pin.
Dirt on bourrelet of shell. This cause and the one above are characterized by a very small indentation in the percussion cap and a slow, jerky sliding of shell into tube during loading.	Clean shell thoroughly.
Percussion cap not pierced in center. This is identified by the off-center position of cap, and can be easily determined by inspection. The stabilizer of shell is defective.	Set shell aside for destruction.
Defective ignition cartridge. A satisfactory cartridge has a properly positioned cap and a 1/32- to 1/16-inch indentation.	Replace ignition cartridge.
Safety device set on SAFE (1941 and 1943 models only).	Rotate safety 180° to FIRE position.

52. ELEVATING OR TRAVERSING SCREW JAMMED OR MOVING WITH DIFFICULTY.

Probable cause	Remedy
Screw dirty.	Clean and lubricate.
Screw bent.	Turn weapon over to Ordnance

Note.- The screw of the elevating mechanism may be jammed because the shock absorber does not absorb enough of the shock. This is the result of improper placement of the weapon or because the base plate has slid back. Correct the emplacement.

53. SHOCK ABSORBER KNOCKS.

Probable cause	Remedy
Spring bent or broken.	Replace spring.
Housing bent or damaged.	Turn weapon over to Ordnance

54. JAMMED SHOCK ABSORBER RODS.

Probable cause	Remedy
Insufficient lubrication.	Use more oil.

55. SHORTENED RANGE.

Probable cause	Remedy
Oil, water, or grease in tube.	Clean barrel.
Wet increment charges.	Use only dry charges.

56. EXCESSIVE MOVEMENT OF MORTAR DURING FIRING.

Probable cause	Remedy
Improper emplacement.	Emplace correctly.

57. FAILURE OF ROUNDS TO EXPLODE ON IMPACT.

Probable cause	Remedy
Failure to remove cap of M-1 fuze.	Remove cap on future rounds.
Defective fuze.	Change fuze lot and report defective fuzes to Ordnance.

58. PREMATURE ARMING OF FUZE.

Probable cause	Remedy
Membrane broken or cracked.	Set shell aside and notify Ordnance for disposal.
Red circle visible on M-1 fuze.	Set shell aside and notify Ordnance for disposal.

SECTION XI. FIRING TABLES

DO NOT USE THESE TABLES BEFORE

READING THESE EXPLANATORY NOTES

59. GENERAL.

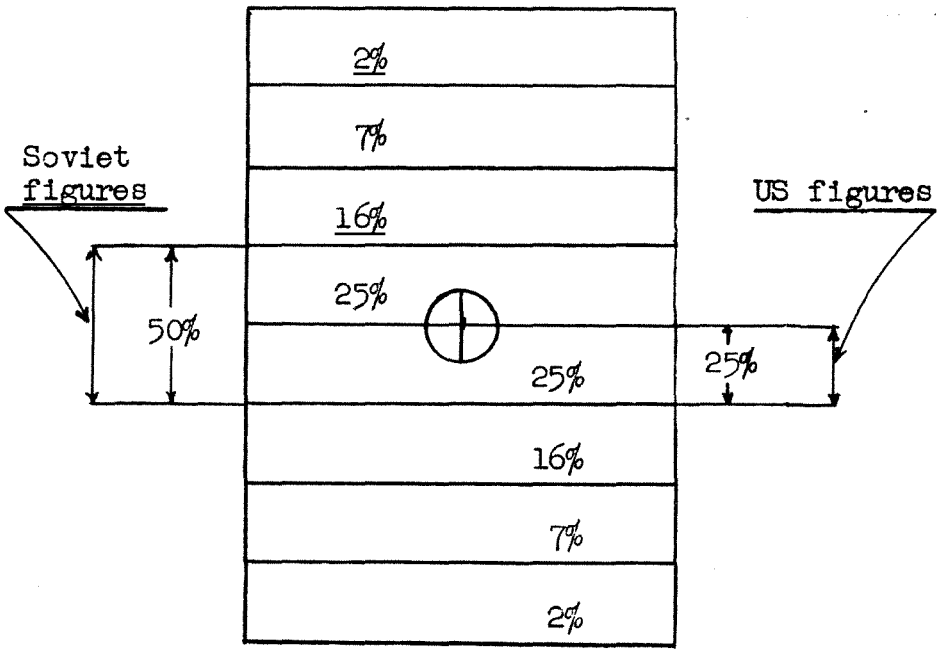
a. Soviet data. These tables are a translation of the original Soviet tables of 1947. The data have not been verified by actual tests by the Ordnance Corps.

b. Soviet mil system.

(1) The Soviet mil system differs from the US system in that the circle is divided into 6000 mils instead of 6400.

(2) On all Soviet mortar sights, 45° elevation has been arbitrarily assigned the value of 1000 mils (10-00). As the angular elevation increases, the mil reading decreases.

c. Probable error factor. The probable vertical error in the firing tables is computed differently than in US tables. It involves the entire 50 percent dispersion zone, while the US probable vertical error includes only the 25 percent zone. See sketch below.



60. APPLICATION OF TABLES.

a. HE and smoke shells. These tables are for the Soviet 82-mm mortar HE shells 0-832 and О-832Д (0-832D). They can also be used for the 82-mm smoke shell Д-832 D-832), but in the case of the smoke shell the known range must be increased by 4 percent, because the smoke shell is slightly heavier than the HE shell. If, for example, the known range is 2,000 yards, consider the range to be approximately 2,100 yards when using the accompanying tables for the smoke shell. (2000 x $\frac{4}{100}$ = 80 or roughly 100 yards. 2000 + 100 = 2100 yards).

b. Types of increments. HE shell 0-832 (six fins) and smoke shell Д-832 (six fins) use a maximum of six "boat-type" increments. HE shell 0-832A (ten fins) uses a maximum of three "ring-type" increments. The boat-type and ring-type increments are NOT interchangeable. These shells may also be fired with the ignition cartridge (charge 0) only.

c. Number of increments used. Soviet increment charges listed in these tables are numbered from charge 0/0 through charge

6/3 in fractional form, as follows:

Charge 0/0

Charge 1/-

Charge 2/1

Charge 3/-

Charge 4/2

Charge 5/-

Charge 6/3

The number before the slash (numerator) indicates the number of boat-type increments to be used with the HE shell 0-832 (six fins).

The number following the slash (denominator) indicates the number of ring-type increments to be used with HE shell 0-832Д (ten fins).

Example: Charge 2/1 indicates that two boat-type increments and shell 0-832 can be used, or one ring-type increment and shell 0-832Д can be used for that particular mission.

d. Converting meters to yards. For conversion of meters to yards, multiply the number of meters by 1.09. Thus, 100 meters equals 109 yards.

61. TABLES. The following tables are for firing under normal conditions. Corrections for wind, temperature, atmospheric pressure, and differences in elevation between the mortar and the target will be found in the FT-82-1, Foreign Firing Tables for Soviet 82-mm Mortar.

TABLE 1

SELECTION OF CHARGES AND INITIAL SIGHT SETTING

Range in Yards	Range in Meters	No. of Charge (Numerator - "Boat-type," Denominator - "Ring-type")							Range in Meters
		0/0	1/-	2/1	3/-	4/2	5/-	6/3	
		Soviet Sight Setting in Mils							
109	100	3-50	-	-	-	-	-	-	100
218	200	4-58	3-38	-	-	-	-	-	200
328	300	5-81	3-85	3-48	-	-	-	-	300
437	400	7-36	4-34	3-81	3-46	-	-	-	400
547	500	-	4-86	4-14	3-72	3-50	3-36	-	500
656	600	-	5-42	4-49	3-98	3-71	3-55	3-48	600
766	700	-	6-02	4-84	4-26	3-93	3-75	3-65	700
875	800	-	6-70	5-21	4-53	4-16	3-95	3-82	800
984	900	-	7-51	5-61	4-81	4-39	4-15	4-00	900
1094	1000	-	8-56	6-02	5-09	4-61	4-35	4-17	1000
1203	1100	-	-	6-47	5-38	4-84	4-55	4-35	1100
1312	1200	-	-	6-98	5-69	5-09	4-76	4-53	1200
1422	1300	-	-	7-58	6-02	5-34	4-96	4-71	1300
1531	1400	-	-	8-35	6-37	5-60	5-17	4-90	1400
1640	1500	-	-	9-93	6-74	5-88	5-39	5-09	1500
1750	1600	-	-	-	7-16	6-16	5-62	5-29	1600
1895	1700	-	-	-	7-65	6-46	5-85	5-49	1700
1968	1800	-	-	-	8-25	6-77	6-10	5-71	1800
2078	1900	-	-	-	9-25	7-11	6-37	5-94	1900
2187	2000	-	-	-	-	7-49	6-65	6-17	2000
2297	2100	-	-	-	-	7-92	6-94	6-40	2100
2406	2200	-	-	-	-	8-46	7-25	6-64	2200
2515	2300	-	-	-	-	9-20	7-57	6-88	2300
2625	2400	-	-	-	-	-	7-93	7-14	2400
2734	2500	-	-	-	-	-	8-36	7-42	2500
2843	2600	-	-	-	-	-	8-92	7-73	2600
2953	2700	-	-	-	-	-	9-78	8-07	2700
3062	2800	-	-	-	-	-	-	8-46	2800
3171	2900	-	-	-	-	-	-	8-94	2900
3281	3000	-	-	-	-	-	-	9-58	3000

TABLE 2

BASIC BALLISTIC DATA

Range in Yards	Range in Meters	Soviet Sight Setting in Mils	Angle of Elevation in Degrees & Min.		Angle of Fall in Degrees	Maximum Ordinate in Meters	Time of Flight in Seconds	Probable Error in Meters		Range in Meters
								Range	Azimuth	
CHARGE 0/0 - Muzzle Velocity 229 f.p.s.										
92	85	3-33	85	00	85	218	14	1.2	1.1	85
109	100	3-50	84	00	84	216	14	1.3	1.3	100
218	200	4-58	77	31	78	204	14	1.9	1.8	200
328	300	5-81	70	09	71	188	13	2.8	1.9	300
437	400	7-36	60	51	61	163	12	4.2	1.6	400
518	475	10-00	45	00	46	107	10	6.1	1.0	475
CHARGE 1/- Muzzle Velocity 344 f.p.s.										
207	190	3-33	85	00	85	500	21	4.0	2.2	190
218	200	3-38	84	42	85	500	21	4.0	2.4	200
328	300	3-85	81	53	83	498	21	4.6	3.3	300
437	400	4-34	78	57	80	493	20	5.2	3.8	400
547	500	4-86	75	50	77	486	20	5.9	4.1	500
656	600	5-42	72	30	74	475	20	6.7	4.3	600
766	700	6-02	68	53	71	460	19	7.7	4.2	700
875	800	6-70	64	48	67	437	19	8.9	4.0	800
984	900	7-51	59	55	63	401	18	10.	3.5	900
1094	1000	8-56	53	39	56	343	16	12.	2.8	1000
1166	1065	10-00	45	00	48	250	15	13.	2.2	1065

TABLE 2 (cont)

Range in Yards	Range in Meters	Soviet Sight Setting in Mils	Angle of Elevation in Degrees & Min.		Angle of Fall in Degrees	Maximum Ordinate in Meters	Time of Flight in Seconds	Probable Error in Meters		Range in Meters
								Range	Azimuth	
CHARGE 2/1 - Muzzle Velocity 432 f.p.s.										
278	255	3-33	85	00	85	763	25	6.4	3.2	255
328	300	3-48	84	06	85	760	25	6.8	3.6	300
437	400	3-81	82	08	83	752	25	7.6	4.4	400
547	500	4-14	80	08	81	744	25	8.4	5.1	500
656	600	4-49	78	05	79	734	25	9.3	5.6	600
766	700	4-84	75	58	78	722	25	10.	5.9	700
875	800	5-21	73	44	76	707	24	11.	6.1	800
984	900	5-61	71	22	74	690	24	12.	6.1	900
1094	1000	6-02	68	52	71	669	24	13.	6.0	1000
1203	1100	6-47	66	10	69	644	23	14.	5.8	1100
1312	1200	6-98	63	08	66	612	23	15.	5.5	1200
1422	1300	7-58	59	33	63	572	22	17.	5.0	1300
1531	1400	8-35	54	56	59	519	21	18.	4.3	1400
1640	1500	9-93	45	24	51	412	18	20.	3.3	1500
1645	1505	10-00	45	00	49	393	18	20.	3.2	1505
CHARGE 3/- Muzzle Velocity 508 f.p.s.										
383	350	3-33	85	00	86	1000	29	8.6	4.2	350
437	400	3-46	84	15	85	1000	29	9.0	4.6	400
547	500	3-72	82	42	84	996	29	9.8	5.4	500
656	600	3-98	81	06	82	990	29	11.	6.1	600
766	700	4-26	79	28	81	984	29	12.	6.7	700
875	800	4-53	77	49	80	976	29	13.	7.1	800
984	900	4-81	76	09	78	967	29	14.	7.5	900
1094	1000	5-09	74	27	77	956	28	15.	7.7	1000
1203	1100	5-38	72	42	75	943	28	16.	7.9	1100
1312	1200	5-69	70	52	74	926	28	17.	7.9	1200
1422	1300	6-02	68	54	72	905	27	18.	7.8	1300
1531	1400	6-37	66	46	70	880	27	19.	7.7	1400
1640	1500	6-74	64	33	68	850	26	21.	7.3	1500
1750	1600	7-16	62	02	66	809	26	22.	6.9	1600
1859	1700	7-65	59	06	64	756	25	23.	6.3	1700
1968	1800	8-25	55	29	60	690	24	24.	5.6	1800
2078	1900	9-25	49	30	53	598	22	26.	4.5	1900
2099	1920	10-00	45	00	50	528	21	27.	4.2	1920

TABLE 2 (cont)

Range in Yards	Range in Meters	Soviet Sight Setting in Mils	Angle of Elevation in Degrees & Min.		Angle of Fall in Degrees	Maximum Ordinate in Meters	Time of Flight in Seconds	Probable Error in Meters		Range in Meters
								Range	Azimuth	
✓ CHARGE 4/2 - Muzzle Velocity 573 f.p.s.										
465	425	3-33	85	00	86	1250	32	10.	5.3	425
547	500	3-50	84	02	85	1240	32	11.	5.9	500
656	600	3-71	82	45	84	1240	32	12.	6.7	600
766	700	3-93	81	25	83	1230	32	13.	7.4	700
875	800	4-16	80	03	82	1220	32	15.	8.0	800
984	900	4-39	78	41	81	1210	32	16.	8.5	900
1094	1000	4-61	77	19	80	1200	32	17.	9.0	1000
1202	1100	4-84	75	56	79	1190	31	18.	9.3	1100
1312	1200	5-09	74	29	77	1170	31	19.	9.5	1200
1422	1300	5-34	72	58	76	1160	31	21.	9.5	1300
1531	1400	5-60	71	23	75	1140	31	22.	9.6	1400
1640	1500	5-88	69	44	74	1120	30	23.	9.5	1500
1750	1600	6-16	68	01	72	1090	30	24.	9.3	1600
1859	1700	6-46	66	14	70	1060	30	26.	9.1	1700
1968	1800	6-77	64	22	69	1030	29	27.	8.7	1800
2078	1900	7-11	62	21	67	993	29	28.	8.3	1900
2187	2000	7-49	60	05	65	956	28	30.	7.8	2000
2297	2100	7-92	57	28	63	911	27	31.	7.1	2100
2406	2200	8-46	54	15	60	850	26	32.	6.4	2200
2515	2300	9-20	49	50	56	754	25	33.	5.5	2300
2575	2355	10-00	45	00	51	650	23	34.	4.9	2355

TABLE 2 (cont)

Range in Yards	Range in Meters	Soviet Sight Setting in Mils	Angle of Elevation in Degrees and Min.	Angle of Fall in Degrees	Maximum Ordinate in Meters	Time of Flight in Seconds	Probable Error in Meters		Range in Meters
							Range	Azimuth	
CHARGE 5/- Muzzle Velocity 632 f.p.s.									
529	485	3-33	85	00	86	1460	35	13.	6.2	485
547	500	3-36	84	50	86	1460	35	13.	6.3	500
656	600	3-55	83	41	85	1450	35	14.	7.0	600
766	700	3-75	82	31	84	1440	35	16.	7.8	700
875	800	3-95	81	20	83	1430	34	17.	8.5	800
984	900	4-15	80	08	82	1420	34	18.	9.1	900
1094	1000	4-35	78	56	81	1400	34	20.	9.6	1000
1203	1100	4-55	77	42	80	1390	34	21.	10	1100
1312	1200	4-76	76	28	79	1380	34	22.	10	1200
1422	1300	4-96	75	13	78	1370	34	24.	11	1300
1531	1400	5-17	73	57	78	1350	33	25.	11	1400
1640	1500	5-39	72	39	77	1330	33	27.	11	1500
1750	1600	5-62	71	18	75	1310	33	28.	11	1600
1859	1700	5-85	69	53	74	1290	33	29.	11	1700
1968	1800	6-10	68	23	73	1270	32	30.	11	1800
2078	1900	6-37	66	48	72	1240	32	32.	10	1900
2187	2000	6-65	65	08	71	1210	31	33.	10	2000
2297	2100	6-94	63	23	69	1180	31	34.	9.7	2100
2406	2200	7-25	61	32	68	1140	31	36.	9.2	2200
2515	2300	7-57	59	34	66	1100	30	37.	8.7	2300
2625	2400	7-93	57	24	64	1060	29	38.	8.1	2400
2734	2500	8-36	54	50	62	1010	29	40.	7.5	2500
2843	2600	8-92	51	30	60	939	28	41.	6.7	2600
2953	2700	9-78	46	21	55	818	26	43.	5.9	2700
3074	2720	10-00	45	00	53	768	25	44.	5.7	2720

TABLE 2 (cont)

Range in Yards	Range in Meters	Soviet Sight Setting in Mils	Angle of Elevation in Degrees and Min	Angle of Fall in Degrees	Maximum Ordinate in Meters	Time of Flight in Seconds	Probable Error in Meters		Range in Meters
							Range	Azimuth	
CHARGE 6/3 - Muzzle Velocity 691 f.p.s.									
563	515	3-33	85 00	86	1650	37	16.	6.4	515
656	600	3-48	84 08	85	1640	37	17.	7.2	600
766	700	3-65	83 06	85	1630	37	19.	8.0	700
875	800	3-82	82 04	84	1620	37	20.	8.7	800
984	900	4-00	81 01	83	1610	37	22.	9.4	900
1094	1000	4-17	79 57	82	1600	36	23.	10.	1000
1203	1100	4-35	78 53	82	1580	36	25.	11.	1100
1312	1200	4-53	77 49	81	1570	36	26.	11.	1200
1422	1300	4-71	76 44	80	1560	36	28.	11.	1300
1531	1400	4-90	75 38	79	1540	36	29.	12.	1400
1640	1500	5-09	74 29	79	1530	36	31.	12.	1500
1750	1600	5-29	73 17	78	1510	35	32.	12.	1600
1859	1700	5-49	72 02	77	1490	35	34.	12.	1700
1968	1800	5-71	70 44	76	1470	35	35.	12.	1800
2078	1900	5-94	69 23	75	1450	35	36.	12.	1900
2187	2000	6-17	68 00	74	1430	34	38.	12.	2000
2297	2100	6-40	66 36	73	1400	34	39.	11.	2100
2406	2200	6-64	65 10	72	1370	34	41.	11.	2200
2515	2300	6-88	63 42	71	1340	33	42.	11.	2300
2625	2400	7-14	62 10	69	1310	33	43.	10.	2400
2734	2500	7-42	60 30	68	1280	33	45.	9.9	2500
2843	2600	7-73	58 39	66	1240	32	46.	9.5	2600
2953	2700	8-07	56 35	65	1190	31	48.	8.9	2700
3062	2800	8-46	54 14	63	1130	30	50.	8.2	2800
3171	2900	8-94	51 24	60	1060	29	52.	7.5	2900
3281	3000	9-58	47 30	57	950	28	54.	6.7	3000
3324	3040	10-00	45 00	54	875	27	55.	6.4	3040

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